

CHOICE

THIS ONE'S JUST RIGHT

How to find the right mattress

WATER HEATERS

Gas or electric, storage or instantaneous? Some answers

ANTIBIOTICS

Using them wisely

'Low-tar' cigarettes — the real story



'Hybrid' bikes



Impact drills



CHOICE

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All products tested for CHOICE are bought randomly in the marketplace and no samples are accepted. Evaluations are based on tests, trials and expert judgments as appropriate. These findings should not be applied to models other than those nominated in CHOICE. We do not necessarily evaluate every available product or service in a particular class. We check the results of our tests just before publication with manufacturers, but specifications and quality may vary. If this issue is no longer current check with us or the manufacturer to determine if important changes have taken place before you buy. If, despite our extensive checking, a mistake slips through we will publish a correction as soon as possible.

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The Association is managed on a day-to-day basis by a committee comprising the four department managers and a staff-elected representative.

Editorial

A FEW eyebrows were raised when it was first suggested CHOICE test cigarettes. True, we'd tested them before, way back in 1961 and '62 — then we listed brands in order of their yield of 'total solids' (essentially, tar plus nicotine), warned about the growing body of evidence linking smoking with diseases such as lung cancer and arteriosclerosis, but noted: "One significant point is that apparently no life insurance firms make any inquiry regarding smoking in their questionnaires". Things have certainly changed!

Then, we used the standard 'smoking machine' test developed by industry — one two-second, 35 mL puff every minute — which is still used today to determine yield amounts stated on cigarette labels and in the 'smoke yield table results' published by the Commonwealth Government as part of the Drug Offensive. Recently, however, overseas studies of smoking behaviour have indicated this smoking pattern is fairly unrealistic and doesn't represent what many smokers actually do.

We decided, therefore, that rather than keeping a safe moral distance from cigarettes, we could provide smokers with important information by testing cigarettes to different smoking patterns from the standard test to see if tar, nicotine and carbon monoxide yields change when smoking behaviour changes.

You can read the full report starting on page 14, but in essence the answer is: yes, do. This means the figures you see on cigarette labels tell only a very small part of the story — that the '4 mg tar or less', '0.4 mg of nicotine or less' should be the maximum amounts of tar and nicotine you'll get if you smoke the cigarette the same way as the machine smokes it. It's not adequate information for consumers — particularly for those trying to minimise their tar intake by smoking supposedly 'low-tar' brands.

Naturally the only foolproof way to lower your tar intake is to give up smoking, but that's no reason not to give accurate information to people who choose not to.

Jane Mackenzie
Editor





Cover photo: Kent Mears



Next issue

Washing machines, car batteries, water filters update, vitamins and minerals, security screen doors, alternative energies, life insurance, insurance disputes schemes reviewed, small appliance life.

October, November, December

Tests: Disposable nappies, vacuum cleaners, wall oven update, soft coolers, telephones, lawnmowers, cockroach killers, gourmet brie, cask wine, video game systems, electric fans, CHOICE's annual buying guide.

Features: House and contents insurance, buying a secondhand car, energy options for home renovation, alternative medicine, mortgage options, dental care, questions on child care, 'junk' insurance, how private is personal information?

Features

18 Sleep E-zzzz

We tell you how to be like Goldilocks and find a bed that's just right.

30 Antibiotics

They're certainly wonder drugs, but being cluey about taking antibiotics could be better for both your health and their useful life.

Tests

7 Hybrid bikes: tents, portaloos and bicycles

We trialled eight hybrid bikes — a kind of cross between a mountain bike and a racer — in the 600 km Big NSW Bike Ride, and found them to be adaptable and fun.

14 'Low-tar' cigarettes — the real story

If you thought the label '2 mg of tar or less' meant that's the maximum tar you could inhale from that brand of cigarette, think again. The labelling is based on a standard machine test that appears to be unrepresentative of the real range of people's smoking behaviour. You could be getting much more than the amount on the label.

23 Water heaters

What's the cheapest kind of water heater to run — gas or electric? Storage or instantaneous? What's best for the environment? We tell you how to decide, based on where you live.

42 Impact drills for DIY

You need an impact drill for drilling stone, brick and cement, and these days they sell for around the same price as a non-impact drill at the DIY end of the market. Our tests revealed a couple of good performers for around \$120.

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Ethical shopping; Consumers' Association update; nicotine patches to help quit smoking; alcohol in kids' medicine; reliability panel; dangerous strippers; feeding the birds; errors in loan contracts; bank complaints.

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Worm farms turn organic waste into fertiliser; CFC-free fridges on the market.

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Don't give up if your insurance claim is knocked back on what seems to be a technicality — the law could be on your side.

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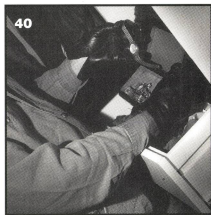
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From soda water to champagne.

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Test yourself with our regular consumer quiz.





CHOICE CUTS

Consumers' Association update

STICKING UP FOR CONSUMERS

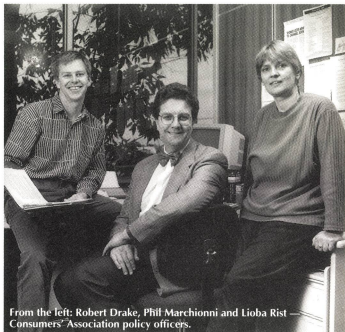
CHOICE is not the only way the Consumers' Association tries to improve the consumer's lot. Our policy officers, who regularly put pressure on industry and government, talk about some of the work they've recently been involved in:

■ **Life insurance.** "We've been lobbying for two years on various life insurance issues. We're about to see significant reforms in the industry dispute resolution scheme. It will become more independent, decisions will be made public and broader types of complaint will be heard. At the moment you can't resolve verbal misrepresentations by agents — but that represents a fair proportion of complaints. Also, it looks like the government will soon force life agents to disclose commissions." — Robert Drake.

■ **Health.** "We're on a campaign committee with other consumer groups lobbying for a charter of health rights — for instance that patients should receive proper information about the risks of treatment and have access to their medical records any time they wish." — Lioba Rist.

■ **Communications.** "We are building on the deficiencies of the pay TV saga to push for a consumer representative on a communications advisory committee. We're in discussions with the Australian Broadcasting Authority and we're attempting to talk to the minister to lift the level of consumer input." — Phil Marchionni.

■ **We're also putting the consumer's view forward in the current debates about competition policy, tax cuts, food irradiation and food endorsement programs.**



From the left: Robert Drake, Phil Marchionni and Lioba Rist — Consumers' Association policy officers.

Purchasing power

THE ETHICAL SHOPPER

INCREASINGLY, consumers want to know more about the impact the product — or its manufacture — has on the environment, other people or animals. Take CB and EK, subscribers from Seven Hills, NSW: "We have be-

come increasingly disturbed regarding CHOICE's failure to address the issue of child labour content in imported goods in any way..."

Although we don't have the resources to investigate this and similar issues in depth, we understand that choosing products is not always a question of price and quality alone. A few pointers for future purchases include:

■ **Levi Strauss** of blue jeans fame plans to scale down and eventually eliminate its manufacturing in China until human rights improve there.

■ **MaLAM** — the Medical Lobby for Appropriate Marketing — continues to fight misleading advertising of drugs. It has a membership of 700 in 30 countries, mostly health professionals. Every month MaLAM writes to one drug company outlining concerns with the marketing of one of its drugs. The letter is published in a monthly newsletter, along with feedback from previous months.

Although most criticism is targeted at activity in developing countries, many of the companies are large multinationals which also sell drugs in Australia.

One of MaLAM's past successes was the withdrawal of nikethamide from the Third World where its manufacturer, Ciba-Geigy, had marketed it for respiratory disorders, breathing difficulties in the elderly and reluctance to eat in infants. In this case MaLAM had been unsatisfied with evidence backing these claims.

Yearly membership of MaLAM is \$35. Contact PO Box 172, Daw Park 5041.

■ **When it comes to avoiding products from companies which employ children, the bottom line is the country of origin and what the labour laws are like in that country — for instance, whether they have minimum age laws and a minimum wage.** According to Grant Smith, managing director of Global Funds Management, an ethical investment company,

countries which don't have good labour laws include South American countries, Thailand "to a lesser extent", India and China.

■ **Communicate your concerns to the companies involved.** If ethical issues are important to you but you're stuck for words, you could use the following:

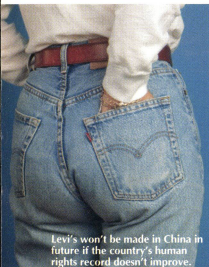
I am writing to inform you I will no longer be buying your company's products.

I used to be a regular consumer of your [brand] but I am now taking ethical issues into account when shopping.

I am concerned because your company has been criticised for involvement in [poor working conditions/oppressive regimes in the Third World/South Africa/nuclear power/animal testing, etc].

I would happily buy your products again should your company cease its involvement in these areas.

*Yours sincerely
Name/date/address*



Levi's won't be made in China in future if the country's human rights record doesn't improve.

CONSUMER ACTION REWARDED

THE battle for consumer rights often seems a long and unending one, but this year such activity has been recognised and commended by the new Syd Einfield Active Consumer Awards, inaugurated by Jeannette McHugh, federal Minister for Consumer Affairs.

The foundation winners of the awards are Phyllis Johnson, Peter O'Keefe and Suzanne Kennedy.

Phyllis Johnson has been at the centre of citizen consumer activity for many years, and was pivotal in the early Campaign Against Rising Prices (CARP) movement. CARP was run by ordinary consumers who built up awareness and a network of information on the issue of fair prices.

Peter O'Keefe and Suzanne Kennedy are members of the Homefund Action Group, who have battled the NSW Government for justice for Homefund participants. They've helped over 2500 families having difficulty with their mortgage repayments to negotiate with Homefund (a 'low-start' housing scheme promoted by the NSW Government), and were major forces in persuading the Government to "take the whole disaster seriously", as Jeannette McHugh said in her address. They lost their jobs in the process.

The award is named after a pioneer of the consumer movement, Syd Einfield, who was NSW Minister for Consumer Affairs during the 1970s.



Federal Minister for Consumer Affairs Jeannette McHugh presents the Syd Einfield Active Consumer Award to Peter O'Keefe and Suzanne Kennedy of the Homefund Action Group.

Quit for life?

NICOTINE PATCHES

THE nicotine patches recently approved for prescription in Australia might sound like an easy 'fix' for nicotine dependency — just stick one on the inside of your arm and the patch will deliver a measured dose of nicotine through your skin. In theory you shouldn't need to smoke any more.

They won't necessarily stop you craving a cigarette, however (you can't grab a patch when the phone rings, for example). For this reason, the Australian Drug Evaluation Committee, which approved the sale of NICOTINELL patches, has cautioned users to seek counselling as well.

Studies have shown using the patch is unlikely to be successful when used without behavioural counselling. Typical trials show that after six months, over two

thirds of smokers who use only patches will be smoking again. In some trials the success rates are much lower.

Furthermore, there can be health risks. If you want to use the patches to help you stop smoking:

- Don't smoke and wear a patch. It's thought the increased nicotine has been responsible for a number of heart attacks.
- Don't wear a patch if you're pregnant or are recovering from a heart attack.
- Don't wear a patch if you suffer from diabetes, hypertension or any cardiovascular disease.
- Consult your doctor about any symptom which occurs while you're wearing the patch. The most well-established side effect is skin irritation; and some people have reported having vivid dreams.

CARTONS THE COOLEST

WHICH container keeps your milk coldest: plastic, glass or cardboard cartons? While it may be debatable how much difference a few degrees make to the freshness of your milk, recent tests by the CSIRO have shown it stays colder for longer in a cardboard carton.

The tests examined the rate of warming of milk in plastic, glass

and cartons in various sizes, both indoors and outside under direct sunlight. Milk in cartons warmed up less rapidly, and the carton kept it up to 5°C cooler than glass or plastic.

Cartons also protect milk against the action of UV light, which can destroy some of the vitamins it contains.

Wildlife

FEEDING THE BIRDS

COULD birdseed shapes made with PVA glue inadvertently poison wildlife who filched it in chunks overnight, ask SV and MV of Newport, NSW.

We're told the majority of birdseed shapes sold in supermarkets are made with gelatine, not glue — Davis Gelatine Australia has goodnaturedly supplied the recipe for consumers who want to make their own. The NSW Poisons Information Centre does not consider ingesting PVA glue a problem for children, but we think gelatine must certainly be safer in the long term.

Ingredients

Gelatine	25 g (5%)
Water	95 g (19%)
Birdseed	380 g (76%)

■ In a metal container heat water to 60°C (too hot to put your hand in).

■ Slowly add gelatine to water and stir until a smooth consistency is achieved.

■ Cool the gelatine solution to 40°C (lukewarm — just above blood heat).

■ Add the birdseed to the gelatine solution and gently blend the mixture very thoroughly.

■ Allow the mixture to stand for 20-30 minutes. This allows the seeds to take up any extra moisture.

■ Fill prepared moulds with birdseed mixture; hangers can also be incorporated at this stage. To ensure no air bubbles form, press the mixture in tightly.

■ Place the filled moulds in a fridge at 4°C overnight.

■ Release the birdseed shape from the mould.

■ Hang or stand the formed birdseed shapes in a warm dry place for several hours to allow them to dry. (Important: if this step is rushed or omitted the shape will remain soft and prone to infestation by moulds and other fungi.)

... ON NO ACCOUNT SHOULD YOU CONSULT THE BIRDS...



Food hygiene

CHOP ON WOOD

WOODEN chopping boards are more hygienic than plastic ones, according to a finding by microbiologists at the University of Wisconsin, reported in the *New York Times*.

Despite plastic's reputation for being the safer surface, the researchers found food poisoning bacteria were quickly killed on all seven types of wood they tested. Within three minutes, 99.9% of the bacteria deliberately placed on

wooden chopping boards had not survived. By the next day, not a single bacterium was detectable. On plastic cutting surfaces, however, the bacteria survived and multiplied.

While it's still sensible to wash all cutting boards well after each use, the researchers noted that wooden boards may be preferable to plastic in that "small lapses in sanitary practices" appear not to be as dangerous.

A MORE RELIABLE RELIABILITY PANEL

SOME of you may have heard of our reliability panel — several thousand subscribers who record data for us on the reliability of appliances they own. It started back in 1988 and you may have wondered what happened to it. No, it hasn't died a death — we've been refining the systems and redesigning our method of collecting data. We're grateful to all those who have been involved — your participation has been extremely valuable and we're glad to say the new-look project is now running smoothly.

The new streamlined version calls for panel members to complete specific questionnaires twice a year, rather than the initial plan where we

called for comprehensive information every three months and were consequently flooded with data — and the panel felt as if they were constantly filling in forms. We'll use the information we're gathering from the appliance reliability panellists in future CHOICE reports.

In addition to appliance reliability, we've extended the panels to follow the consumer's fate in the privatisation of water supplies, electricity and the telephone system, and we'll use the information given to us to lobby on consumers' behalf in any future debates.

If you're interested in participating in any of the panels, please contact 'Reliability', CHOICE, 57 Carrington Road, Marrickville 2204.

Can you help?

DOMESTIC AIR TRAVEL

EVER been out of pocket, disappointed or inconvenienced by poor or non-existent domestic airline service? Or surprised the insurance policy you were persuaded to take when you booked the tickets didn't cover discounted travel?

Perhaps you've found yourself 'fogged in' and unable to reach your destination when the airline assured you it was a low-risk flight. Have you had to wait an hour or so for a connecting flight because there was no direct service, or the flight was delayed?

CHOICE is researching how well our domestic carriers respond to their customers' needs: how well they inform them, whether they consult consumers about their wants and needs, and how willing they are to redress problems.

We would like to hear your experiences, good and bad. Can customer service for domestic air travellers be improved? Write to: 'Airlines', CHOICE, 57 Carrington Road, Marrickville 2204, by August 31, 1993.

Thank you for your help.

SMOKE DETECTORS

CHOICE is investigating the incidence of smoke detectors/alarms failing to operate in the event of fire or high concentrations of smoke. If you have experienced a failure of these devices, we would like to hear from you.

Write to 'Smoke Detectors', CHOICE, 57 Carrington Road, Marrickville 2204, with details of the incident, including the unit's brand and model number, age, and a diagram showing the location of both the fire and the smoke detector(s).

Thank you for your help.

EXTENDED WARRANTIES ON USED CARS: SCAM OR BLESSING?

WE are researching the area of **added or extended warranties** offered to consumers on **used cars**. For a cost, these warranties will cover your car for parts and/or labour when something goes wrong after any statutory warranty has ceased. But cover can be patchy, and this can lead to disputes.

If you've purchased one of these warranties we would like to hear your experiences. Please consider:

- Which company issued the warranty?
- How much did it cost?
- How long did the warranty last?
- Have you made a claim under the warranty?
- If so, what was the claim for?
- Was the claim handled to your satisfaction? Please give details, both positive and negative if applicable.
- Would you purchase an added or extended warranty again?
- Have you any advice or tips for other consumers about buying added or extended warranties?

Please write to 'Extended warranties', CHOICE, 57 Carrington Road, Marrickville 2204, to reach us by September 14, 1993.

Thank you for your assistance.

Finance

ATTENTION ALL BORROWERS

MAJOR suppliers of consumer finance in NSW have been caught out for making errors in loan contracts which breach the NSW Credit Act. Those involved include such big names as Westpac, the State Bank of NSW and Household Financial Services.

When an error in such a loan contract is picked up — perhaps by the borrower, who reports it to the Department of Consumer Affairs — the lender is automatically precluded under the Credit Act from collecting interest payments on the loan and is required to notify affected borrowers either by direct mail or advertisement. The company must then lodge an application with the Commercial Tribunal, requesting full reinstatement of its right to enforce repayment of the interest component of each loan.

The Commercial Tribunal then considers evidence, usually from the NSW Consumer Affairs Commission, the borrowers and the

finance provider, in order to determine what percentage of interest charges should be reinstated to the lender. The Tribunal's determination is usually based on the number of contracts affected and the dollar value of the loans involved.

In the Westpac case, which involved 100 000 loan contracts, the Tribunal decided to reinstate 99% of credit charges. The 1% reduction represented a \$2.4 million penalty for Westpac.

Consumers with affected loan contracts would need to write to the offending lender to receive a partial refund of the interest they'd paid. Money left over out of the amount the lender must set aside to refund to borrowers must be placed in some form of public trust fund (probably the Financial Counselling Trust Fund).

Soon consumers in all states will have access to redress against credit providers under proposed uniform national credit legislation.

YOUR MONEY, YOUR BANK, YOUR SAY

THE results from a consumer phone-in co-ordinated by the Australian Federation of Consumer Organizations and the Australian Financial Counselling and Credit Reform Association confirm the need for the introduction of a compulsory Code of Banking Practice covering all banks and all areas of consumer banking.

A total of 3905 complaints was lodged during the national eight-hour phone-in. The exercise was designed to elicit consumers' views on what were the major issues of concern in relation to banking in the nineties. This was to ensure those issues were addressed in the development of a compulsory Code of Banking Practice.

Complaints covered all areas of banking, although excessive or

unfair fees were the highest category of all (27%).

There was a high level of complaint about cheque accounts and savings accounts, which are largely unregulated. Complaints related to excessive/unfair fees and non-disclosure of information, delay, failure to follow customer instructions and other service-related problems. Most consumers (76%) also found it difficult to compare various accounts on the basis of price due to the lack of uniform presentation of interest rates.

In the loans area, home and business loans received the highest level of complaint: non-disclosure of fees and inadequate provision of information were of particular concern to consumers.

TENTS, PORTALOOS AND BICYCLES...

It's five in the morning at Darling Harbour, Sydney; Saturday, March 27. Scores of cyclists, bleary-eyed, are wheeling, riding and carrying their bicycles to a row of cattle trucks. Bikes deposited, they take their seats — clutching helmets and water bottles — on one of the fleet of coaches heading to Port Macquarie. They'll spend the next eight days making their way back. It's the first day of the RTA Big NSW Bike Ride — and the start of CHOICE's trial of hybrid or 'cross' bikes.

WE PLANNED to test eight nationally available hybrid bikes in the \$500 to \$700 price bracket and had spent months in preparation for this day. We'd mustered a band of willing and able volunteer trialists, fine-tuned our questionnaires, run the bikes in for a fortnight or so and stocked a van with enough tools and spares to keep the eight bikes on the road for the duration of the ride.

Our thanks go to the Bicycle Institute of NSW, who did an admirable job of organising the Big Bike Ride and allowed us to carry out our trial during it.

The CHOICE team and bicycles converged at Port Macquarie — eight rider trialists, technical officer and journalist. Day 1's riding was a gently undulating 35 km along the coast and then inland, from Port Macquarie to Laurieton.

Even before the sun had risen on day 2 tents rustled, zips zipped and the keenest of the 1500 cyclists on the ride made their way to washstands, toilet trucks and the breakfast queue. The early start was a feature of mornings to come — no sleep-ins that week. The

CHOICE team established another routine: trialists gathered at the CHOICE moving landmark — a white van — to pick up the bike they would ride that morning. Each rider rode a different bike in the morning and afternoon and rode each bike twice throughout the ride. This gave us 16 chunks of data for every bike.

After adjustments were made — checking brakes and gears were in order, setting the correct saddle heights and checking tyre pressure — each rider set off and would find the van again at the lunch spot.

As we left Laurieton, dark clouds gathered and the rain poured down, threatening to wash out the day's 82 km ride. But a few growls of thunder and flashes of lightning didn't put us off. In fact we were glad to be giving the bikes some wet-weather riding too — a good test for brakes. Twenty kilometres down the track we had our first taste of dirt riding — a mixture of rocky surfaces and mud. Some of the steeper and muddier sections meant getting off the bikes. The PROTOUR CRX 200's gears didn't fare

well in the mud, and were more affected than the others.

Our trialists had a lot of fun riding on the dirt — many of them were used to racing bikes and were glad not to be riding them. They felt more confident and could go faster on the hybrids: "These hybrid bikes are fantastic on the dirt — it's like being a kid again!"

Roosters and kookaburras only just got in before the tent rustling at the start of day 3 — Wingham to Gloucester, 67 km. Some riders would have liked a change from the hybrid's flat handlebars, which encourage an upright riding position — not the best for the day's headwind.

One of our trialists, John, was last to the van on day 4 and found the wrong bike waiting for him. A statistical disaster was averted by Stephen, our technical officer, who pulled his tent down at break-neck speed and caught up with the culprit at the first water stop. It was a longish day, 81 km to Dungog, with nearly 50 km to lunch, so the mistake had no serious upshots. After that, no-one left without triple-checking with Stephen they had the right bike.

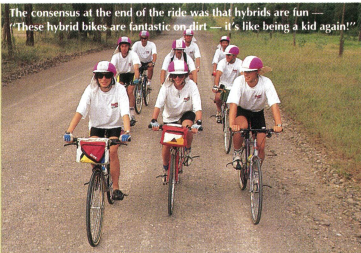
WHAT IS A HYBRID BIKE?

A HYBRID BIKE is a practical compromise between the tough-as-nails mountain bike and the lightweight, speedy racing bike.

Although there is no strict definition, bikes sold as hybrids have a number of common features. The wheel size is 700C, and at 35 mm or 38 mm their tyres are not as chunky as mountain bikes' but are wider and more knobby than a racer's. This means they'll grip on dirt surfaces better than a racer's tyres but won't roll quite as fast on smooth roads.

They usually have flat handlebars (giving an upright riding position), a wide gear range like mountain bikes, including a low gear — granny gear — which makes hill climbing more comfortable. They are lighter than mountain bikes and tend to have a frame designed with comfort in mind rather than speed.

The consensus at the end of the ride was that hybrids are fun — "These hybrid bikes are fantastic on dirt — it's like being a kid again!"



Hybrid bikes

Brand/model
(in rank order of trialists' overall preferences)*Manufacturer/
distributor

Origin

1

Price**
(\$)Warranty: frame
and fork/other
parts (years)

2

Frame
materials
claimed

3

Weight
(kg)

4

Brakes

5

Chainrings

SHOGUN Metro SE	Bicycle Corp	Taiwan	500/599	3/1	Cro-Mo	13.1	Cantilever, short levers (D)	Steel 28/38/48T
AVANTI Gazelle	Sheppard Industries	New Zealand	539/725	lifetime/1	Cro-Mo	13.1	Cantilever, short levers (D)	Steel 28/38/48T
GIANT Innova	Giant Bicycle	Taiwan	589/630	20/1	Cro-Mo	13.1	Cantilever, short levers	Steel 28/38/48T
DIAMOND BACK Cross Campus	Repco Cycles	USA/China (A)	495/580	15/6 months	Cro-Mo triangle (C)	14.2	Cantilever, short levers	Steel 28/38/48T
SHOGUN Metro	Bicycle Corp	Taiwan	475/510	3/1	Cro-Mo	13.2	Cantilever, short levers (D)	Steel 28/38/48T
APOLLO Quick Cross	Apollo Bicycle	Australia/China (B)	649/689	unlimited/1	Cro-Mo	12.7	Cantilever, short levers	Alloy 20/32/42T
PROTOUR CRX 200	Southcott	Australia	475/525	10/90 days	Manganese alloy	12.6	Sidepull, dual pivot, long levers	Steel 28/38/48T
HOLSTAR Trail-X	Holstar Cycles	Taiwan	349/399	10/90 days	Steel	14.1	Cantilever, long levers (D)	Steel 28/38/48T

* A number of brands did not have hybrid bikes available in this price range when we trialled.

** Prices shown indicate the range found in nationwide checks in May 1993.

*** All cranks — which join the pedals to the chainring — are alloy.

(A) Designed in USA, made in China.

(B) Designed in Australia, made in China.

(C) Triangle refers to the tubes between the handlebar, seat and front chainwheel.

(D) Brake adjustment changes as handlebar stem is raised/lowered.

Order of ranking

While the scores from the trialists' ratings during the ride show no significant difference between the top six bikes, their stated preferences at the end of the trial don't quite reflect that equality. We've listed the table in this 'preference' order, but statistically none of these six is 'better' than the others.

The afternoon's riding held more dirt — sometimes like riding on a cushion of gravel. Stroud Hill was a challenge for riders and bikes alike — the tea and cake stall at the top was very welcome!

Day 5's 60 km to Maitland were mainly smooth, flat roads — "I'm surprised how well these bikes cope with smooth bitumen, they are remarkably stable at high speed," said one trialist.

For the other cyclists on the Big NSW Bike Ride, day 6 was a rest day. Not so for the CHOICE team. We persuaded our volunteers to ride 70 km or so to Clarence Town and back, riding the usual two bikes, so we'd get the data we needed. The countryside was beautiful, but some of the roads were very pot-holed; "I'm glad I'm not riding my racer," a trialist said, "I'd be very sore by now — these bikes absorb the bumps a lot better."

Everything went well until on the way back the front brake fell off the PROTOUR. Its manufacturer, Southcott,

1 Price

All the bikes except the **HOLSTAR** are in the \$500 to \$700 (approx.) price bracket. We picked the **HOLSTAR** as representative of a cheaper price bracket to see if you genuinely get more when you pay more. Our trialists' ratings and comments indicate that you do.

2 Frame materials claimed

Cro-Mo is short for chrome molybdenum. See *Buying a bicycle* on pages 12–13 for a discussion of frame materials.

3 Brakes

All but one bike have cantilever brakes, which are operated by a cable pulling arms with brake pads on the end from above. The **PROTOUR**'s operate by a pulling action from the side.

believes the cause was a faulty batch of brake retaining nuts, and as this article was going to press it was negotiating with the Federal Bureau of Consumer Affairs about how best to deal with the problem.

By day 7 we were getting a picture of how riders felt about the bikes. The main difference was in the gear-changing mechanisms — with a split opinion about the 'grip shift' on the **APOLLO** Quick Cross and **DIAMOND BACK** Cross Campus. These bikes' gears were changed by moving part of the handgrip, but as comments in the *Profiles* reveal, you either love it or hate it.

After a foggy start in Maitland, the day's 100 km to Ourimbah were all over main roads, some newly surfaced, some patchy.

The Bicycle Institute of NSW provided daily elevation diagrams as well as a route map (and impressively comprehensive road support). Day 8's route from Ourimbah to Galston looked rather

4 Chainrings

The chainrings and freewheel together determine the gear range and spacing. The chainrings are the sets of cogs at the front. The cogs are described by number of teeth, so all but the **APOLLO** had three chainrings with 28, 38 and 48 teeth respectively.

5 Freewheel

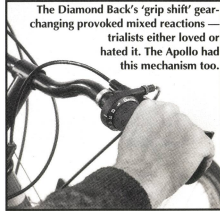
The freewheel is the set of cogs at the back. These bikes had either six or seven, which, in combination with the three chainrings, gives either 18 or 21 gears. Again, the cogs on the freewheel are measured in teeth.

6 Front and rear derailleurs

The derailleur is the mechanism which shifts the chain from cog to cog, thus changing

daunting — three major climbs: Dog Trap Road, Mount White and Berowra Waters. The granny gear — a third, small chainring at the front — on the hybrid bikes came into its own. This gear allows you to keep your legs moving at a reasonable rate. Not only is this more comfortable and lets you carry on climbing, it's also much better for your knees.

The Diamond Back's 'grip shift' gear-changing provoked mixed reactions — trialists either loved or hated it. The Apollo had this mechanism too.



5	6	7	8	9	10	
Wheel	Front and rear derailleurs	Gear shift	Ride score (%)	'Satisfy' score (%)	Overall performance average (%)	Brand/model (in rank order of trialists' overall preferences)
speed 2/28T	Shimano Altus C10	Shimano Altus C10 Rapidfire under-bar levers	86	85	85	SHOGUN Metro SE
speed 2/28T	Shimano Altus A20	Shimano Altus A20 Rapidfire Plus under-bar levers	85	84	85	AVANTI Gazelle
speed 3/30T	Shimano Altus A20	Shimano Altus A20 Rapidfire Plus under-bar levers	81	84	83	GIANT Innova
speed 2/28T	Shimano Altus C10	Grip Shift index selection	87	82	84	DIAMOND BACK Cross Campus
speed 4/28T	Shimano Altus C20	Shimano Altus C20 Rapidfire single under-bar lever	82	86	84	SHOGUN Metro
speed 1/19T	Shimano 400CX	Grip Shift index selection	83	82	83	APOLLO Quick Cross
speed 3/30T	Suntour Accushift	Suntour X-Press under-bar levers	79	78	79	PROTOUR CRX 200
speed 4/28T	Shimano, non-index at front, SIS at rear	Shimano, thumb-operated, on top of bars	75	74	75	HOLSTAR Trail-X

gear. The names 'Shimano Altus C20' etc refer to different standards of 'groupset'. This is a set of components sold by component manufacturers and includes brakes, gears, crankset (chainrings and cranks), hubs and bottom bracket. Of the groupsets on these bikes, Shimano regards A20 as the highest specification, followed by C10 and C20. The specification level affects ease of adjustment, component design and weight. Just to confuse matters, the groupset is often treated by bike manufacturers more like a starting point for componentry — bikes may have a particular groupset for all components except a crankset or gear change, etc. All except the **HOLSTAR** have dual SIS — that is, an indexed system for both front and back cog gear changing. The **APOLLO** is the only bike with a groupset

On day 9, after surviving Galston Gorge — a 5 km descent followed by a seemingly never-ending 6 km climb — we were on the home run. The 40 km final stretch was mainly city riding: stop-start through traffic light land again as the ride sped through Sydney's northern suburbs and over Sydney Harbour Bridge to a warm welcome at Darling Harbour.

This ride raised \$150 000 for multiple sclerosis research. Next year's Big NSW Bike Ride will be from Uralla to Trial Bay, from March 5 to 13. Call (02) 212 5628 for details.

HYBRIDS GET THE THUMBS UP

Six hundred kilometres and only one puncture later, there was a general consensus among our trialists that the hybrids are fun, adaptable bikes which perform well on dirt as well as bitumen. They are ideal for both city and weekend riding.

The main drawback is the flat handlebars, which give you only one

specially designed for hybrid bikes (the Shimano 400CX); it is all alloy and has quite different gear ratios from the other bikes, though a similar range.

7 Gear shift

Shimano Rapidfire operates using the thumb only; the Rapidfire Plus requires thumb and forefinger. The Suntour X-Press requires thumb only. In grip shifts, part of the handlebar grip moves. For more discussion of gear-changing mechanisms see *Buying a bicycle*.

8 Ride score

This score reflects ease of adjusting the bike, its handling over different conditions (hills, smooth roads, broken surfaces and dirt),

riding position. Although this wouldn't bother you over short rides, for longer touring you might like handlebar attachments (bar ends or aero bars) for alternative riding positions. Bikes tend to be sold 'bald' — without accessories such as mudguards — so you would also want to consider other attachments; see *Buying a bicycle* on pages 12–13.

WHAT TO BUY

As a group, the bikes did well. They all survived the ride with no major problems. Each time the trialists rode a bike they filled in a questionnaire rating a variety of aspects, and it's from these that the scores in the table above are drawn. They essentially fall into two groups: six bikes whose scores range from 81% to 87% in both scoring categories, and only 83% to 85% overall; and a lower group of two bikes with scores in the seventies.

Of these two — the **HOLSTAR Trail-X** and the **PROTOUR** — the **HOLSTAR** was

ease of braking, the comfort of the ride and how easy it was to relax. The score is the average of trialists' ratings from very good to very bad for each attribute.

9 'Satisfy' score

The 'satisfy' score reflects the overall satisfaction of a rider with a particular bike, including responsiveness, cornering, handling, slow and fast riding, gear range, lightness, strength and feeling of safety. The score is the average of trialists' ratings from very good to very bad for each attribute.

10 Overall performance average

We combined 'ride' and 'satisfy' equally to give an overall score.

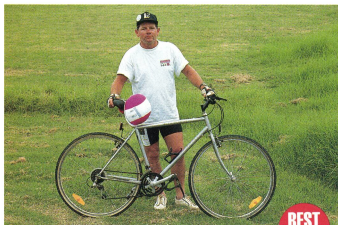
significantly cheaper than the other bikes: it was included for comparison as representative of bikes in a cheaper price range. As well as the problem with the **PROTOUR**'s brakes, its gears were badly affected by mud.

At the end of the ride we asked trialists which bikes they liked most and least. This confirmed the **HOLSTAR**'s position: it seems at this price point it's worth spending an extra \$100 or so if you can afford it. It also confirmed the **PROTOUR** in second-last place.

Although the trialists' ratings show the other six bikes as being, as one trialist put it, "very much on a par. Basically you're picking between gear mechanisms", their picks for what they liked best did show some preferences and we've listed the bikes in that order in the table above. The **SHOGUN Metro SE** came out top in trialists' preferences, and our price checks indicate you can find it quite widely available for \$500–\$550. At that price it would be the 'Best Buy'.

PROFILES

The bikes are listed in order of trialists' overall preference — alphabetically when equal (see table). Prices shown indicate the range found in nationwide checks in May 1993. Many thanks to our intrepid volunteers, pictured here with the bikes.



**BEST
BUY**

SHOGUN METRO SE

Price: \$500/\$599

■ Good features include a sealed bottom bracket, which is better for riding in the mud and wet and should mean it requires less maintenance.

■ Most riders liked the gear changes: "fabulous twin-lever gears"; "very crisp and precise changes. Excellent twin-lever set-up. Gear changes worked extremely well throughout range". But some found the action confusing. Have a go yourself if you're thinking of buying the bike.

■ A number of trialists like the gear range — "excellent gear ratios".



AVANTI GAZELLE

Price: \$539/\$725

■ Was the best bike for fast riding — "able to stop quickly if required"; "fun to lean into corners".

■ Scored among the best for feeling safe because of good traction, steering and control.

■ Our tester said of the manual, "a model of clarity" — it was specific to the model and detailed the correct way to change tyres and so on.

■ Sealed bottom bracket.



GIANT INNOVA

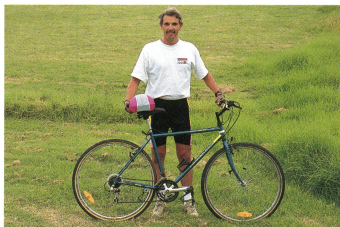
Price: \$589/\$630

■ Trialists' comments paint a picture of a stable, safe-feeling bike. It has a full chrome molybdenum frame and an oval down-tube for added stiffness.

■ "Good reliable traction especially when accelerating in thick sand."

■ Riders commented favourably about brakes — "easy to reach levers and very positive response" — which could explain the high score in relaxing and also in safety — "I felt very safe, good grip and short stopping distance".

■ Scored well for slow riding.



DIAMOND BACK CROSS CAMPUS

Price: \$495/\$580

■ The heaviest bike in the trial, hence comments such as "sluggish feel" and "feels heavy" on hills. Its weight (14.2 kg) could also explain why it didn't rate well for fast riding.

■ Was one of two with slightly swept-up handlebars (the other was the **HOLSTAR**), which some liked but according to others was "good for up hills and flat roads, but downhill it was hard to get down and streamline".

■ A number of testers commented favourably on the sprung seat, the only one of its kind in our trial — "nice suspension".

■ It has a grip shift gear change which, like the **APOLLO**'s, comes down to personal preference: "gear grip shift most practical"; "I was reluctant to grip the handlebars over the gears for fear of them changing accidentally".

■ The pedals were the only ones in our trial which weren't toe-clip adaptable — we fitted new pedals for the trial.

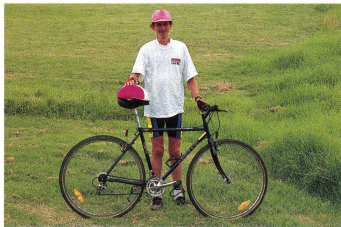
■ Sealed bottom bracket.



SHOGUN METRO

Price: \$475/\$510

- Trialists rated its gear range highest of all the bikes — 18 gears with 14-28T rear cluster. Comments included: "excellent ratios" and "could use a higher gear for downhill and flats".
- It scored well for slow riding.
- It scored poorly for comfort — "seat felt too hard and dug into me — probably too narrow".
- The components were slightly lower-grade than its stablemate, the SHOGUN Metro SE.
- Sealed bottom bracket.



APOLLO QUICK CROSS

Price: \$649/\$689

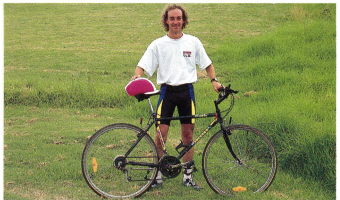
- The gears are set up with tighter spacing on the back cogs than other bikes in the trial. But trialists were split as to whether this was bad — "It was poorly geared for the trip, it's more of a racing cluster" — or good — "I think it would satisfy anyone, you can get better use of the full range of the gears, there's less overlapping."
- Similarly, the grip shift was "handy" for some while others "didn't like the twist grips, they were a problem in the rain, I found them slippery."
- One of the lightest bikes in the trial.
- The only bike with special hybrid bike components — the main difference was the gear ratios.
- The seat post adjuster is operated by an allen key — a good compromise between the quick release which can invite theft and bolts which require a spanner.



PROTOUR CRX 200

Price: \$475/\$525

- Despite being one of the lightest bikes in the trial this bike *felt* heavy — "a pig to push".
- Gears were awkward to change: "too much thumb pressure required to change front gears"; "sometimes the derailleur wouldn't move at all, clunking into place after a couple of minutes". This affected how much a rider could relax: "I had to plan gear changes in case they didn't work smoothly."
- Although all riders fitted the frame adequately, the seat post was too short for some and had to be set 2 cm above the maximum mark for proper leg fit.
- The gears were more affected by mud than any other bike in the trial.
- Has 18 gears but came with a manual for 10 and 12-speed road bikes.
- Front brake fell off on day 6 of the trial — the manufacturer thinks the problem was a faulty batch of retaining nuts and shouldn't affect all PROTOURS.



HOLSTAR TRAIL-X

Price: \$349/\$399

- This bike was significantly cheaper than the others in the trial (we wanted to see how a representative of a cheaper price range rated) and was picked as such by the trialists. Only the rear gears were indexed; for the same price you could probably find fully indexed gears. But it scored well for comfort and — like the others — made the trip without serious mishap.
- The cantilever brake arms moved unequal distances and were not easy to adjust.
- The 18 gears were "cumbersome due to the gear change being stiff and in a bad position".
- Although one of the heaviest, a number of riders commented that it felt flimsy and too light.
- The seat post was too tight in the seat tube so became badly scratched as it was adjusted.
- Some people liked its upswept handlebars.

BUYING A BICYCLE

TALK to any keen cyclist and they'll tell you, whatever you do, to buy a bike from a specialist bike shop rather than a department store. You'll be relying on the shop to assemble your bike correctly, adjust it to fit you and service it after six weeks. Bike shops probably do have the edge, with on-site workshops for adjustments and more knowledgeable staff. But we weren't impressed with the general standard of assembly of the bikes we bought from specialist bike shops.

Four out of the eight bikes were missing one component or another on delivery. The **HOLSTAR Trail-X** was also poorly assembled and required adjustment before the trial. The rear wheel was skewed, the rear brakes were rubbing, one toe clip was attached upside down and the rear wheel side reflectors were loose.

So check as much as you can while you're still in the shop and test ride the bike if possible. Take it back for adjustments if you find brakes rubbing or gears not changing properly. Check a brochure to see what the bike you're buying should include (a bell, toe clips, reflectors, etc).

The process of buying a bike should start before you even get to a shop. Have an idea of your total budget including accessories and think about what you will use the bike for. Look around to get a picture of what's available, and at what price. A good bike shop should be willing to discuss your options; the points on these two pages will help you ask the right questions.

Frame, gears and brakes are fundamental to the bike, but other aspects are more adaptable. Saddles, tyres and pedals can be swapped — sometimes at no extra charge.

Make sure you buy the right size of bike, and that it is adjusted to fit you — that the seat and handlebar heights are correct, that you are neither cramped nor stretched out too much. When the saddle is correctly adjusted, the leg should fully extend with the heel on the pedal. This means the leg will be slightly bent when the foot is in the correct pedalling position. A good bike shop should be able to advise you here.

Also, remember bikes do need running in — cables stretch, for instance. So a new bike should be serviced about six weeks after purchase. Many shops offer this without charge.

If you want to know more about bikes, watch out for the **CHOICE Guide to Bicycles**, due to be published in a few months.

■ **Wheels** come in different diameters, widths and materials. Small wheels are generally stronger but slower than larger ones. The width affects strength and grip, and material — usually steel or alloy — affects wear and weight. Steel wheels are heavier and will rust.

Standard mountain bike wheels are smaller and wider than those of racing bikes. On hybrids, wheels tend to be the same diameter as racing bikes', with a width somewhere in between racers and mountain bikes.

Wheels may be bolted on or have **quick-release** systems which mean they are easier to remove — whether to put a bike in a car or for repairing a puncture. Saddles may also be fixed by quick-release mechanisms, but bear in mind that if they are easier for you to remove, the same goes for a thief. **Allen key** mechanisms are convenient to use and more thief-proof.

■ **Saddles** come in a variety of shapes and materials. The fit and feel are personal. Hard and narrow leather ones are the traditional racing type; wider saddles may better suit women's wider pelvic bones. Saddles may be sprung or padded with foam or gel. All the ones in our trial had padded anatomic seats — the **DIAMOND BACK's** was also sprung.



■ The term **gear ratios** refers to the range of gears and the difference between them. They are especially important over longer rides and when climbing hills. Efficient cycling consists of pedalling at a steady rhythm (80 cycles per minute). Gears help you do this, whatever the slope, load or wind, without overstraining. Racing bikes tend to have closely spaced gears for gradual increases in speed. Mountain bikes and hybrids tend to have a wider range for a variety of conditions, including a 'granny gear' — a third, small cog on the front. It gives you a low

gear good for steep hills or sustained climbs.

Most bikes now have **derailleur** gears. These systems move the chain between cogs. One of the main differences between our test bikes was their **gear-changing mechanisms**. **Indexed systems**, which move the chain precisely from cog to cog, are convenient and easy to use but rely on correct adjustment of cables. Older **friction systems** rely on the rider judging the correct lever position — beginners may find them harder to use. Our test showed a preference for indexed mechanisms positioned

■ The **frame** must be the right size — on racers you should be able to straddle the top bar with your feet on the ground and with at least 2.5 cm to spare — more on hybrids (5 cm) and mountain bikes (7.5 cm). It must also fit your arm length. Most models come in a number of sizes. A good bike shop should help you choose the right size for you — don't just take whatever size they happen to have in stock. For our trial, we chose a group of riders of similar size so they would fit the same frame size.

The frame weight affects the total weight of

the bike more than any other component. And the frame weight is largely determined by the material it's made of. Options include:

Steel.

High-tensile steel (Hi-ten).

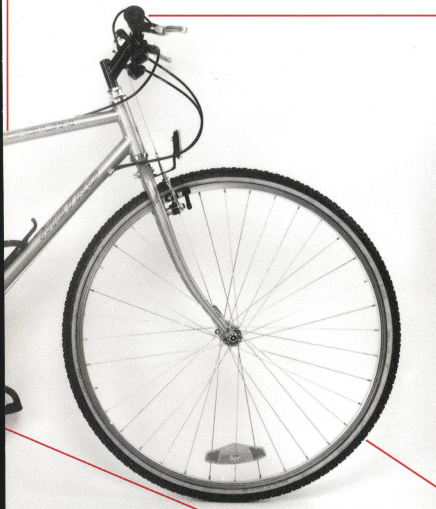
Chrome molybdenum steel alloy (Cro-Mo).

Aluminium alloys.

Steel will be heavier to push. Other options are lighter but may be more expensive, so you'll probably end up having to compromise between budget and lightness. A light bike may also feel less stable. Sometimes the main tubes will be of one material and the forks another.

■ Most sports bikes have dropped **handlebars**.

As well as allowing a low-slung position for speed and wind resistance, the dropped handlebar gives the rider several hand and riding positions — you can hold the bars all round the curve and on the straight part at the top too. This option can keep fatigue at bay for longer and reduce aches and pains. Mountain bikes have straight handlebars, which give more control over rough ground; most hybrids have straight handlebars too. You could reduce the fatigue with the addition of attachments such as bar ends.



below rather than above the handlebar. Some indexed systems are numbered so you can quickly see what gear you're in.

Shifting action also varies. Choices include simple shift levers, thumb shifters on the handlebars, scissor-action mechanisms, and grip shifts which work like the speed controls and gear changers on some motor bikes. No one system is better than the others — it comes down to personal preference. When trying a bike, ask yourself if you're having to push hard to change gears; does it feel comfortable?

■ Can you fit toe clips onto the **pedals**? These make pedalling more efficient — the pedals get a pull upwards as well as a push downwards. They are a bonus, especially when touring. If you think you might like to alternate between toe clips and 'bare' pedals, make sure the pedals can be used both ways up. (If you take toe clips off some pedals they tend to fall with a curved side upwards, which is awkward for pedalling). Some pedals are designed to fit a 'system' — where a specially designed shoe locks into a hole in the pedal — and these are said to grip better than toe clips. Whatever pedals you buy, make sure they are wide enough for your foot.

ACCESSORIES

■ If you don't want to end up with a dirty stripe down your back when you ride muddy tracks you need to fit your bike with **mudguards**. These range between \$25 and \$50 a pair.

■ If you want to carry anything — wet-weather gear, shopping — you need a **luggage rack**. These cost between \$40 and \$70.

■ You'll probably need a **lock**. These start at \$15 for a cheap cable lock and go to \$100.

■ Front and rear **lights** are essential for night riding. These start at \$15 per unit.

■ **Toe clip** sets cost between \$10 and \$25.

■ To give yourself a change of position on hybrids, or any other bike with flat handlebars, you'll need **bar ends** — handlebar attachments — which cost from \$40 to \$140.

■ **Bike helmets** are compulsory in all states. They range in price from around \$50 to over \$100.

■ **Tyres** come in different widths and patterns.

The jargon for patterns includes 'slick' — smooth tyres for smooth bitumen road use; and 'knobby' — a chunky, highly textured tyre good for rougher surfaces. 'Multi-purpose' tyres (as on the hybrids we tested) are somewhere in-between and come in a variety of designs. Wide tyres grip better on dirt than narrow ones.

Some tyres are designed to be pumped to higher pressures than others. High pressure may mean a bumpier ride, but as the roll is better, many riders prefer it. The **HOLSTAR** in our trial had higher-pressure tyres than the others, which some riders felt explained why it rolled well.

'LOW-TAR' CIGARETTES — THE REAL STORY

You can inhale a higher level of tar from supposedly 'low-tar' cigarettes if you're not careful how you smoke them.

SMOKERS who complain that smoking low-tar cigarettes is like smoking air are largely correct. Of all the methods employed by the tobacco companies to lower the tar intake level from a cigarette, diluting tobacco smoke with air (drawn in through a narrow band of near-invisible pinprick holes circling the filter) is the most effective.

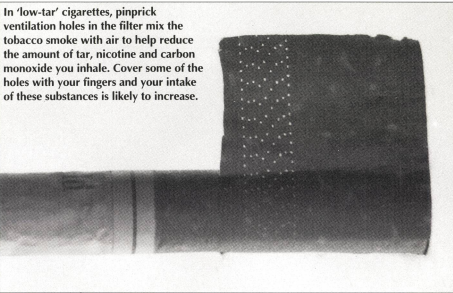
We defined 'low-tar' cigarettes for our test as those labelled as 4 mg tar or less, but the crucial fact is that cigarettes don't deliver a measured dose of tar, nicotine and carbon monoxide (CO) in the same way a capsule delivers a dose of medicine. What's stated on the label are the approximate amounts of tar, nicotine and carbon monoxide the cigarette delivers under specified laboratory smoking conditions. However, many smokers who decide to cut down their tar and nicotine intake by smoking 'low-tar' cigarettes may think the amount of tar, nicotine and CO stated on the label is the amount they're actually going to get from these cigarettes, and often compensate for the 'weak' taste by taking a puff more frequently, inhaling more deeply, or (accidentally or deliberately) covering the holes around the filter with their fingers or lips. Such changes in smoking behaviour do more than make your smoke more satisfactory — they actually increase the amount of tar, nicotine and CO you inhale, so you may well get more than the label leads you to believe.

According to our tests, this can be as much as if you'd smoked a higher-tar cigarette (labelled as '8 mg tar or less' and above).

UNREALISTIC TESTS

The test method for establishing the levels of tar, nicotine and CO was developed by the tobacco industry years ago for its own use, and has been adopted by the Commonwealth health department, among others. This test is used to determine cigarette labelling. The department also publishes 'smoke yield table results' (SYTR) as part of the Drug Offensive, in which it lists the tar, nicotine and carbon monoxide content of cigarettes available in Australia — results determined by this

In 'low-tar' cigarettes, pinprick ventilation holes in the filter mix the tobacco smoke with air to help reduce the amount of tar, nicotine and carbon monoxide you inhale. Cover some of the holes with your fingers and your intake of these substances is likely to increase.



standard test and in consultation with the tobacco companies. However, studies of smoking behaviour indicate this government-approved testing method can give a misleading result for low-tar cigarettes.

The test uses a smoking machine programmed to deliver one 35 mL, two-second puff every minute from each cigarette, with all the ventilation holes open. Overseas research has shown this 60-second interval between puffs on the machine is too long: for smokers about 30 seconds is more realistic (various studies have shown intervals of 22, 26, 28, 42 and 50 seconds). A puff volume of 35 mL also seems too low — different studies have found average puff volumes of 30, 40, 42, 44 and 56 mL.

On the basis that the standard 'smoke yield' test run by tobacco companies and government for labelling purposes doesn't realistically reflect human smoking behaviour — particularly for low-tar cigarettes, when 'compensatory' behaviour like that described earlier often comes into play — we asked the Australian Government Analytical Laboratories (AGAL) to run some tests on cigarettes for us based on different smoking patterns.

We tested most brands of low-tar cigarette (labelled '4 mg or less', '2 mg

or less' or '1 mg or less') plus a few higher-tar brands ('8 mg or less' and above) for comparison. In one test we blocked half the ventilation holes in the filter and in another blocked them all. In a third test we left the holes open but set the machine to puff every 30 seconds instead of every minute, giving roughly twice as many puffs per cigarette.

You can see the full results in the tables overleaf, but the general finding was that the intake of all three substances increased when ventilation holes in low-tar cigarettes were blocked. Smokers could inhale up to three times more tar, for example, than this year's provisional SYTR results indicate when half the holes are blocked, and up to eight times more when they're fully blocked. Fully blocking the holes in fact took the tar intake level of all the low-tar cigarettes we tested up to between 6 mg and 10 mg — equivalent to the result you'd expect from a higher-tar cigarette.

Taking twice as many puffs per cigarette seems to roughly double the amount of tar and carbon monoxide you'd inhale; nicotine a little less than double.

UNHELPFUL LABELLING

Not only is current labelling based on the results of an apparently non-represent-

active smoking test, but at present cigarettes are labelled in 'bands' — instead of stating the precise tar, nicotine and CO yields according to the test, the label says '4 mg tar or less', '0.4 mg nicotine or less', etc. Of the '4 mg or less' brands we tested, tar yield of different brands according to the provisional smoke yield table results ranged from 0.7 mg to 3.8 mg, but you can't find this out from the label. In addition, according to the provisional SYTR, a few of the '2 mg tar or less' and '1 mg tar or less' brands actually produced *more* than these labelled amounts.

Clearly, even based on the standard test, precise labelling of tar, nicotine and carbon monoxide yields would be more helpful than the present 'band' system, and a few states — SA, WA and perhaps the ACT and Queensland — may be moving to this kind of labelling. However, based on the results of our tests of low-tar cigarettes using different smoking behaviour, we'd like to see much wider-ranging changes.

RECOMMENDATIONS

- There needs to be studies of Australian smokers to accurately determine the range of real smoking behaviour.
- Smoke yield tests need to be developed for low-tar cigarettes which accurately reflect the true range of smokers' behaviour — for example, testing the amount of tar, nicotine and CO delivered with ventilation holes ranging from fully open to fully blocked.
- Based on the results of these more realistic tests, labelling of cigarettes for their real range of tar, nicotine and CO yields: for example, "3 mg to 8 mg of tar, depending on smoking behaviour".
- A program to educate smokers about the difference smoking behaviour makes to the amount of tar, nicotine and carbon monoxide they inhale.

In the meantime, if you smoke 'low-tar' cigarettes be wary of adopting smoking behaviour that consciously or unconsciously attempts to compensate for their lower nicotine levels and weaker taste. Overseas studies have shown many smokers who switch to lower-yield cigarettes do adopt such habits as drawing in smoke more forcibly, taking more frequent puffs and so on. This can negate the effect of changing brands.

And we have to say it: even if you're careful not to alter your smoking habits to compensate for lower tar and nicotine levels, smokers of low-tar cigarettes still have a higher risk of heart disease and lung cancer than people who have given up smoking.

(continued overleaf)



SO WHAT DO YOU GET FROM A CIGARETTE?

NICOTINE is often regarded as the culprit in health damage caused by cigarette smoking, but there's more to a cigarette than nicotine:

■ **'Tar'** is formed during the burning of the tobacco. It's a catchall word used to describe the thousands of chemicals that make up, in the main, the visible portion of cigarette smoke, excluding water and nicotine (the 'CPM' you see on cigarette boxes next to the tar level refers to this — 'corrected particulate matter' means what's left after water and nicotine are subtracted from 'total particulate matter'). Several of these chemicals are known carcinogens.

There are several ways to manufacture a cigarette with lower tar yield. It's possible, for example, to lower the number of puffs a smoker can get by packing the tobacco loosely so it burns faster, or by treating the cigarette paper with a chemical to give it a faster burn rate. Paper and filter can also be made porous, and special tobacco blends can be used. The most effective method of reducing potential tar intake, however, is to place a band of pinprick-sized ventilation holes in the filter so that smoke drawn through the filter is diluted by air; in fact you can't get tobacco blends to yield less than 5 mg of tar according to the standard test without these holes. See the main article for more discussion of this method and its limitations.

■ **Nicotine** is an inherent component of tobacco, and it's addictive: the nicotine makes you want to smoke more. Some studies have also linked nicotine with inhibiting the release of oestrogen, temporarily increasing blood pressure and heart rate, and having a role (with carbon monoxide) in the cardiovascular diseases associated with smoking.

■ **Carbon monoxide (CO)** is also formed during the burning of the tobacco, and may be associated with the development of heart disease.

■ **Radiation** is not a commonly recognised health risk of smoking, but research has shown a 30-a-day smoker receives an equivalent annual dose of radiation from smoking to what he or she'd get from 300 chest x-rays. It derives from polonium 210, a radioactive isotope found in phosphate fertiliser used in growing tobacco, which remains in the tobacco throughout processing and becomes highly concentrated in tobacco smoke.

There's another thing that's 'got' from cigarettes: money that goes into both federal and state coffers from tax on tobacco products. It's estimated the Commonwealth Government was to gain \$1323 million last financial year, while the states expected to get around \$1398 million. Do government health expenses on smoking-related diseases cancel these amounts out? We couldn't find complete figures to answer this question, but when you add in money saved on aged care and pensions for the people who die younger than average from these diseases, it seems possible governments aren't out of pocket.

Effect of blocking ventilation holes

Brand (in order of tar levels according to standard test*)	Tar values				Nicotine values	
	Label	Standard test* (mg/cig)	Half-blocked (mg/cig)	Fully blocked** (mg/cig)	Label	Standard test (mg/cig)
BENSON & HEDGES Ultimate	1 mg or less	0.5	2.4	not tested	0.2 mg or less	0.12
RANSOM Ultimate	4 mg or less	0.7	2.3	5.5	0.4 mg or less	0.09
WINFIELD 1 mg	1 mg or less	0.9	3.1	8.0	0.2 mg or less	0.17
BARCLAY King Size	4 mg or less	1.0	2.4	9.4	0.4 mg or less	0.12
RANSOM Ultimate 1	1 mg or less	1.2	3.3	8.2	0.2 mg or less	0.22
STRADBROKE Micro Mild 2	2 mg or less	1.7	3.8	7.5	0.4 mg or less	0.24
HOLIDAY Ultra Mild 2 mg	2 mg or less	1.8	4.4	not tested	0.4 mg or less	0.27
LONGBEACH Ultimate 2 mg	2 mg or less	1.8	3.7	7.1	0.4 mg or less	0.28
WINFIELD Ultra Mild Menthol	4 mg or less	2.2	4.1	not tested	0.4 mg or less	0.25
ALPINE Ultimate 2 mg	2 mg or less	2.3	4.9	9.6	0.4 mg or less	0.30
HOLIDAY Ultra Mild	4 mg or less	2.3	4.5	not tested	0.4 mg or less	0.31
PETER JACKSON Ultimate 2 mg	2 mg or less	2.3	3.8	not tested	0.4 mg or less	0.34
WINFIELD Ultra Mild	2 mg or less	2.4	3.9	not tested	0.3 mg or less	0.36
WINFIELD Ultra Mild King Size	4 mg or less	2.4	4.7	not tested	0.4 mg or less	0.36
BENSON & HEDGES Ultra Mild	4 mg or less	2.6	5.2	not tested	0.4 mg or less	0.36
NOW Mild De Luxe Filter	4 mg or less	2.7	4.8	not tested	0.4 mg or less	0.30
ALPINE Ultra Lights	4 mg or less	3.0	5.1	not tested	0.4 mg or less	0.40
ESCORT Ultra Mild 4	4 mg or less	3.0	4.7	not tested	0.4 mg or less	0.40
PETER JACKSON Ultra Mild	4 mg or less	3.1	4.5	7.7	0.4 mg or less	0.43
PETER STUYVESANT Ultra Mild King Size	4 mg or less	3.1	4.7	not tested	0.4 mg or less	0.34
DUNHILL De Luxe Ultra Mild	4 mg or less	3.2	4.5	not tested	0.4 mg or less	0.34
LONGBEACH Ultra Mild	4 mg or less	3.2	4.7	7.3	0.4 mg or less	0.41
STRADBROKE Ultra Mild 4	4 mg or less	3.2	5.1	not tested	0.4 mg or less	0.44
FORTUNE Ultra Mild	4 mg or less	3.8	4.7	not tested	0.4 mg or less	0.49
WINFIELD Super Mild King Size	8 mg or less	4.9	6.1	not tested	0.8 mg or less	0.70
ALPINE Extra Lights	8 mg or less	6.3	8.7	10.6	0.8 mg or less	0.76
DUNHILL Superior Mild	12 mg or less	7.1	7.8	9.6	1.2 mg or less	0.82
PETER JACKSON Super Mild	8 mg or less	7.8	8.1	9.2	0.8 mg or less	0.78
ALPINE Lights	12 mg or less	8.0	9.0	11.3	1.2 mg or less	0.91
WINFIELD Extra Mild King Size	12 mg or less	8.1	9.1	not tested	1.2 mg or less	0.95

* Standard test = provisional Smoke Yield Table Results (SYTR).

** We didn't test all the cigarettes with fully blocked ventilation holes as we thought half-blocking the holes was a more realistic scenario for smoking behaviour. However, we tested some fully blocked in order to discover the likely range of intake levels from all holes open (standard test) through to all holes blocked.

Effect of puff frequency variation

Brand	Tar values		Nicotine values		CO values	
	Standard test* (mg/cig)	Our test** (mg/cig)	Standard test* (mg/cig)	Our test** (mg/cig)	Standard test* (mg/cig)	Our test** (mg/cig)
BENSON & HEDGES Ultimate	0.5	1.3	0.12	0.19	0.6	1.4
WINFIELD 1mg	0.9	2.2	0.17	0.34	1.0	2.7
LONGBEACH Ultimate 2mg	1.8	3.1	0.28	0.45	1.8	2.8
BENSON & HEDGES Ultra Mild	2.6	4.8	0.36	0.59	2.5	5.5
ESCORT Ultra Mild Menthol 4	2.6	4.8	0.36	0.62	2.3	4.5
ALPINE Ultra Lights	3.0	6.2	0.40	0.75	3.0	5.0

* Standard test = provisional Smoke Yield Table Results, with a puff every 60 seconds, all ventilation holes open.

** Our test: a puff every 30 seconds, all ventilation holes open.

Carbon monoxide (CO) values

all-blocked (mg/cig)	Fully blocked** (mg/cig)	Label	Standard test* (mg/cig)	Half-blocked (mg/cig)	Fully blocked** (mg/cig)	Brand (in order of tar levels according to standard test*)
29	not tested	2 mg or less	0.6	3.3	not tested	BENSON & HEDGES Ultimate
22	0.39	5 mg or less	1.0	3.9	10.5	RANSOM Ultimate
41	0.78	2 mg or less	1.0	4.0	11.7	WINFIELD 1 mg
26	0.77	5 mg or less	0.8	1.8	9.1	BARCLAY King Size
43	0.79	2 mg or less	1.2	4.0	11.2	RANSOM Ultimate 1
43	0.65	5 mg or less	1.6	4.3	10.1	STRADBROKE Micro Mild 2
60	not tested	3 mg or less	2.0	4.2	not tested	HOLIDAY Ultra Mild 2 mg
44	0.64	5 mg or less	1.8	3.9	8.4	Longbeach Ultimate 2 mg
38	not tested	5 mg or less	2.2	5.0	not tested	WINFIELD Ultra Mild Menthol
53	0.88	5 mg or less	2.4	5.5	11.8	ALPINE Ultimate 2 mg
51	not tested	5 mg or less	2.5	4.7	not tested	HOLIDAY Ultra Mild
49	not tested	5 mg or less	2.2	4.7	not tested	PETER JACKSON Ultimate 2 mg
50	not tested	3 mg or less	2.6	5.4	not tested	WINFIELD Ultra Mild
45	not tested	5 mg or less	2.6	6.1	not tested	WINFIELD Ultra Mild King Size
55	not tested	5 mg or less	2.5	6.7	not tested	BENSON & HEDGES Ultra Mild
46	not tested	5 mg or less	2.5	5.2	not tested	NOW Mild De Luxe Filter
61	not tested	5 mg or less	3.0	5.6	not tested	ALPINE Ultra Lights
49	not tested	5 mg or less	2.8	5.9	not tested	ESCORT Ultra Mild 4
52	0.82	5 mg or less	3.1	4.8	10.1	PETER JACKSON Ultra Mild
44	not tested	5 mg or less	3.4	6.1	not tested	PETER STUYVESANT Ultra Mild King Size
45	not tested	5 mg or less	3.7	6.0	not tested	DUNHILL De Luxe Ultra Mild
53	0.77	5 mg or less	3.1	5.3	9.6	Longbeach Ultra Mild
51	not tested	5 mg or less	3.5	6.5	not tested	STRADBROKE Ultra Mild 4
56	not tested	5 mg or less	4.2	5.6	not tested	FORTUNE Ultra Mild
58	not tested	10 mg or less	5.3	7.6	not tested	WINFIELD Super Mild King Size
91	1.02	10 mg or less	5.3	8.7	12.0	ALPINE Extra Lights
83	0.94	10 mg or less	8.3	9.4	11.9	DUNHILL Superior Mild
80	0.83	10 mg or less	7.9	8.9	10.3	PETER JACKSON Super Mild
86	1.15	10 mg or less	7.7	9.0	11.0	ALPINE Lights
02	not tested	10 mg or less	7.6	9.1	not tested	WINFIELD Extra Mild King Size



The 'smoking machine' at the Australian Government Analytical Laboratories — cigarette labels reflect the intake levels it achieves under precisely defined smoking conditions. These may be quite different from what you get if your smoking behaviour is different.

SLEEP E-ZZZZZ

The quest for a mattress that's just right

When buying a new bed you're confronted with dozens of mattress and base sets that all look much the same. Here's how to choose...

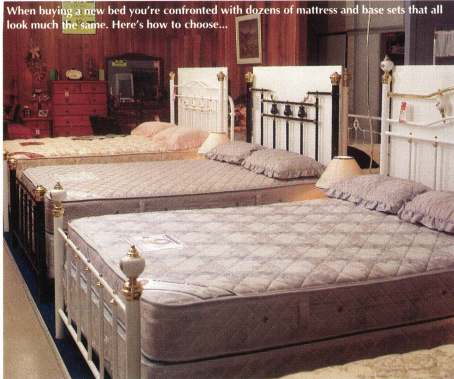


Photo taken courtesy Sleep City, Punchbowl NSW

WHEN TO BUY A NEW BED?

AIM to replace your mattress every eight to 15 years, depending on its initial quality. By then the support in the springs has decreased and the bed may not be hygienic. An annual bed check is important when your bed has seen a few years' service.

You could be ready for a new bed if: you don't sleep well, your back aches, you feel tired in the morning, your muscles hurt, you feel drained and lack energy due to improper rest, or you and your mate have no room to move on your mattress. When checking your bed, ask yourself the following questions:

- Is the cover soiled, stained or torn?
- Does the mattress surface look uneven?
- Are there sagging spots where you usually lie or around the edges?
- Does the foundation (base) have an uneven or sagging surface?
- Would you be embarrassed to show your bed without covers to your neighbours?
- Is the mattress comfortable in some places and in some positions but not in others?
- When you turn over do you hear creaks, crunches or other suspicious noises?
- When you roll around, does the bed wobble or sway?
- Are you and your partner rolling together without meaning to?
- Are you fighting each other for the covers or enough space to get comfortable?

Give yourself one point for every yes answer. If you score eight to 10 points your old mattress and base are definitely ready for retirement.

MATTRESSES are known in the bedding industry as 'mystery bags': when a consumer goes shopping for a new bed, he or she is confronted with dozens of mattress and base sets that all look much the same. It's difficult to find out for certain how the various brands and models differ on the inside, where it matters most.

This article takes the mystery out of buying a new innerspring bed, to ensure you get value for money and the comfort and support your sleeping body needs.

Value for money

One obvious difference between the array of mattresses available will be price. Manufacturers divide the mattress market into four price ranges based on the type of base and springs and padding used in construction (see *The mattress market*, overleaf, for more details). It's possible to pay anything from \$300 to \$3000 for a queen-size mattress and base set. Not everyone has thousands of dollars to spend on an 'ultra-premium' bed so your goal should be to purchase the bed with the best features within the price range you can afford.

Sometimes the price can tell you as little about the comfort, support and durability of a mattress as its appearance. Less reputable manufacturers have been known to use opulent coverings over substandard springs and comfort layers. Because the mattress looks expensive, retailers may be able to 'mark up' the price and earn a bigger margin (difference between wholesale and retail price) than they could by selling a bed with better springs and padding at the same price.

The absence of a uniform labelling scheme for all mattresses makes it difficult to avoid this trap (see right for more information on labelling). 'Big name' manufacturers will supply cutaway models of their mattresses or brochures with photographs of materials used in

the bed, which may help you assess the standard of materials used in some beds. It isn't financially viable for smaller companies to provide these expensive promotional materials, which means shopping around and asking questions is the only sure way to compare the information supplied by different retailers and manufacturers. If a retailer can't explain to you or show you what's inside a bed, go to another shop.

A warning on warranties

Buying the mattress with the longest warranty can be another trap. Warranties are not performance guarantees. A 15-year warranty does not ensure your mattress has a life expectancy of 15 years. Some manufacturers use longer warranty periods as a marketing tool to draw consumers away from better-known brands.

The warranty should be an indication that the manufacturer is willing to fix faults of design, material or workmanship for a stated number of years, but the meaning of some warranties is quite muddy. Long warranties may work on a pro-rata basis. For example, some manufacturers offer five to 15-year *limited* warranties. Your mattress will be repaired or replaced without charge if service is required due to defects in workmanship and materials during the first five years from purchase. A mattress usu-

ally has to be used with its matching base for the warranty to be valid.

If service is required during the sixth through to the fifteenth year after purchase, you will have to pay $\frac{1}{15}$ of the current recommended retail price of the mattress multiplied by the number of years owned (plus transportation costs). If you'd owned a \$900 mattress for eight years, the repairs would cost at least \$480 ($[\frac{1}{15} \times \$900] \times 8$). That's over half the price of a new mattress, when it's believed some innersprings may only give maximum support for eight years anyway.

Some warranties are too restricted in the type of defect they cover. The International Sleep Co, for example, has a 10-year warranty card but the conditions state the warranty only covers the spring system. The warranty conditions omit problems with the quilting, comfort layers or foundation.

In addition, any warranty is only as strong as the company behind it. A 15-year warranty won't be very useful if the manufacturer goes out of business in two or three years, especially if you buy direct from the factory. An example of an attractive but worthless warranty is the 15-year guarantee offered by Slumberzone, a company that has since closed down. The "full 15-year guarantee" it offered is now worthless.

To be more realistic, all manufacturers should move to flat five-year or 10-

year warranties, depending on the grade of materials used in the mattress.



This bed's too soft

A good mattress and base set will be comfortable, supportive and durable. In a famous fairy tale, a little girl discovered not everybody agrees on which sleeping surface is the most comfortable. Some are too soft, some are too hard and some are just right.

You can't judge comfort by pressing a mattress with your hand, elbow or knee or by sitting on the edge or lying down for a few seconds. The method used by Goldilocks to find the most comfortable bed is still the best available to consumers: lying down on the bed for at least 10 minutes is the only way to get any idea of how comfortable it is.

When buying for two take your partner, as both of you should make the decision. Wear comfortable clothes, and shoes you can remove for lying down. Move around to determine if you will have enough space to move freely in your sleep without disturbing the person next to you.

LABELLING

A UNIFORM, INDUSTRY-WIDE labelling scheme is urgently needed in the mattress market. The information currently included on most mattress labels is of limited use to consumers. Different terminology will be used to describe different brands or ranges of bedding or the same terminology will be used in a different context by any number of manufacturers. One manufacturer may describe a bed as "gently firm" while another might label a similar bed "extra firm".

The Australian Spinal Research Foundation (ASRF), in conjunction with a consortium of bedding manufacturers, has attempted to solve the problem of inconsistent labelling by developing a labelling scheme. Before a bed can carry one of the ASRF labels, it will be tested by the ASRF to measure its:

■ **Firmness:** How the bed behaves (that is, deflects) when weight is placed on it. The firmness of a bed is related to the extent it gives under the sleeper. A firm bed tends to stay taut under the body weight, while a softer bed allows the body to sink in further. The beds are measured for firmness on a scale of one to five, with a rating of five representing a very firm bed and a rating of one a very soft bed. Most beds tested lie in the range of two to four. Where applicable, each mattress is tested with its accompanying foundation.

■ **Conformity:** How the bed conforms to the shape of the weight pressing down on it. This is a measure of how the mattress envelops the sleeper's body. The conformity of a mattress is

substantially influenced by the amount of foam or other padding between the fabric cover and the interior structure. This can vary significantly between different bed sets. Again the beds are measured on a scale of one to five, although in this case a score of one would indicate a low degree of conformity and thus a firm bed, a score of five a high degree of conformity and a soft bed.

■ **Additional edge support (where nominated):** When a sleeper rolls over towards the edge of the mattress, additional edge support is supposed to provide a feeling of security. ASRF labels do not give a score for edge support but simply indicate which mattresses do and don't have edge supports.

The ASRF label may be a helpful guide when you're trying to assess the firmness or softness of one mattress in comparison to another. However, the labelling scheme has some limitations. It should not be interpreted as an ASRF endorsement of the manufacturer or brand of bedding. Nor is it a durability rating or a measure of quality. In the firmness ratings, for example, a 'three' bed is not better than a 'two' bed. It simply means the 'three' bed is somewhat firmer — the 'two' bed is not in any way inferior.

The scheme also misses some of the major manufacturers. The manufacturers who have submitted mattresses for testing and labelling are: JF Allen (Tas), AH Beard (NSW), Suparee (Vic), Erlere (Vic), Silent Night (WA), Araman/Therapeutic (Qld) and Adriatic Slumber (SA). It is imperative for such a scheme to be adopted by the whole industry if it's to be of real help to consumers buying a bed.



This bed's too hard

While lying on the bed is the most effective way to assess how comfortable it is, determining the level of support it offers is not so straightforward.

Don't make the mistake of equating correct support with hardness. A mattress that's too hard may only succeed in putting your hips, shoulders and head to sleep. This is because it does not support all parts of the body evenly, tending instead to create pressure points at the heaviest body parts, reducing blood circulation. This is what causes many people to toss and turn and complain of never being able to feel comfortable.

If the mattress is hard to start off with, chances are it will get harder as it gets older. Materials used in the comfort layer, the layer of padding and upholstery that separates the sleeping body from the innerspring system, compress and compact, which means as the years pass you will be sleeping closer to the springs.

If you purchase a mattress that is too soft, on the other hand, your 'heavy bits' will sink into the bed and your spine will not be in proper alignment. This can cause tension as your muscles will have to work to compensate for the lack of

support, leaving you tired and aching in the morning.

A good mattress and foundation will gently support your body at all points and keep your spine in the same shape as a person with good standing posture. Lying on the bed will enable you to judge the position of your shoulders, hips and lower back. However, don't base your judgments about support solely on how the bed feels to lie on.

Don't rely on labels to tell you which mattress will give you the right support either. One manufacturer's 'firm' may feel harder than another's 'extra firm'. It's really the materials used in construction and the way they're put together that determine the degree of support you can expect. The types of springing, comfort materials and foundations to look for are explained fully in *Inside your bed*, opposite.



This bed's just right

A bed will not last you a lifetime, but you should expect it to stay in good working order for six to 15 years, depending on its initial quality. This means you will have to make some judgments while bed shopping about how well made you think the various brands and models are.

The mattress and foundation should look well-made, thick and solid. Beware of those that are less than six inches thick. Mattress corners should have weight and substance. Edges should be solid but resilient. When you roll around, the mattress shouldn't creak, crunch or wobble. Look for a combination of a top-quality innerspring system and several layers of superior upholstery materials.

It's the quality of the materials used and how they're put together that determine how long a mattress and foundation will provide the comfort and support you bought them for. The best assurance of good performance over a good many years is to buy the highest quality sleep set you can afford.

Shop for the best value, not the lowest price. That means going to several shops before making a decision. Manufacturers supply retailers with 'exclusive' model names so you may not be able to find the same-model mattress in two different shops. To overcome this, find a mattress you like, then see what levels of comfort and support you can get for the same amount of money in other shops.

Study all available information, read the labelling and insist the salesperson either shows you models or pictures of the mattress's construction or thoroughly explains the features of beds you're interested in. Don't be fooled into buying the bed that looks prettiest. It's what's inside that counts.

The mattress market

Market segment	Market share (%)	Price groups for queen-size (\$)	Foundation	Support	Comfort layer	Life expectancy (years)
ULTRA-PREMIUM (leading edge)	10	1299-3000	Plenty of wooden slats and springs, continental tailoring, thicker look	Plenty of 'technologically superior' springs with up to seven turns	Silk, wool, cotton, high-grade foams, latex	12-15
PREMIUM (mainstream)	25	800-1200	Fewer slats and springs with standard tailoring and 'slimline' look	Still the brand-name springing system but fewer springs with fewer turns	Cheaper or no wool, cotton, good to high-grade foam, polyester and fibre pads	12
COMMODITY (house brands)	30	500-750	Either fewer slats and springs and slimline look or a timber-only base with no springs	'Standard' Bonnell springs and sometimes fewer of them with fewer turns	Lighter cotton, medium-grade foams, more fibre and needle-felt pads	8-10
BUDGET	35	299-450	Either slimline with still fewer slats and springs or a timber-only base	Still fewer five-turn Bonnell springs	Less, cheaper or no foam, low-weight cotton, coconut fibre or reclaimed cotton	5-6

1 Price range

This table looks at the mattress and base ensemble market. Stand-alone mattresses will be cheaper.

These price ranges aren't set in concrete, but if you find yourself interested in a bed that costs, say, \$750, it's probably worth your while to check some other models within \$100 either side to see whether you're really getting value for money.

2 Foundation

Foundations sold in ensembles are covered in fabric to match the mattress, but may be sprung or of rigid wooden construction (see *Good Foundations* on page 22). Those in the highest price range may have continental tailoring — an expensive upholstery finish where there are no joins around the edge of the base.

3 Support

The 'support layer' is the mattress's springing system (see *In the Spring* opposite).

4 Comfort layer

The comfort layer consists of the insulation and padding materials placed on top of the springing system (see *Padding and Pluff* on page 22).

INSIDE YOUR BED

YOU REALLY have to pull a mattress to pieces before you can decide if it's worth buying. We're not suggesting you take your scissors when shopping for a new bed, but as already explained you should see cutaway models of mattresses and brochures with photographs of the springs and padding used, or you should at least be sure the sales assistant answers all questions to your satisfaction. Before you can ask the right questions and recognise the right answers, you need a basic understanding of how mattresses are made and the differences between brands.

Innerspring mattresses are the most widely purchased type of bedding. They consist of:

- An inner core of tempered steel springs or coils in a variety of configurations that provides resiliency.
- The comfort layer: insulation, padding and top upholstery between the springs and the resting body.
- Some form of foundation (base) to hold the mattress off the ground.

These three components — springs, comfort layer and base — determine the bed's durability, support and comfort.

In the spring

The springing system is the main source of support for the resting body. The original innerspring system was called the Bonnell System — hourglass-shaped individual springs joined together with helical wires. This conventional spring system is still found in many beds, particularly those in the lower price ranges.

Most manufacturers have attempted to improve on the Bonnell spring by creating their own springing system, and each company wants you to believe its springs are technologically superior to others on the market.

Regardless of the brand, five factors

It's what's inside your bed that determines the quality and degree of support it provides — the springs, 'comfort materials' and base. How can you find out without cutting it up?

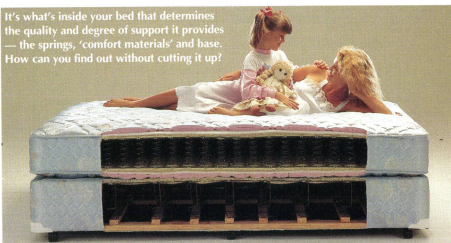


Photo courtesy: Sealy Australia

can influence the degree of comfort, support and durability offered by a bed:

1. The number of springs: There should be at least 300 coils in a double bed. That will translate to more than 375 coils in a queen-size bed and more than 450 in a king-size.

2. Spring shape: There are several variations in spring shape:

- **Pocket springs** are usually narrow top and bottom and wider in the middle. Because of their shape, these springs can't be wired together so they are grouped in interconnected fabric pockets — thus their name. This type of spring would be suitable for someone wanting a plush, soft bed but may not be suitable for a heavier person.

- A concave or hourglass-shaped (Bonnell) spring would be initially soft but firmer as it is depressed, which results in a 'soft but firm' bed.

- The parallel or cylindrical-shaped spring makes the bed firmer. If you pushed down on the spring, there would be an even level of support all the way through.

- Some manufacturers say their beds do not contain individual springs but are made from a continuous coil. A single

length of wire is shaped into a system of coils, which enables the manufacturer to include more coils in the bed. Manufacturers claim the continuous coil system gives greater support and minimises partner disturbance.

3. Wire gauge: Not all springing systems are made from wire with the same strength, durability and quality specifications. Ask for information about the gauge of wire used in the bed. The lower the number, the more durable the wire (that is, 13-gauge wire is thicker and stronger than 16-gauge).

4. Active turns: A further variation is the number of active turns in the spring or coil. This refers to the number of turns in each spring that are actually absorbing and supporting the weight of the body. The more active turns, the softer the bed. Springs with more active turns also last longer because the work is spread, not concentrated on a few sections of wire.

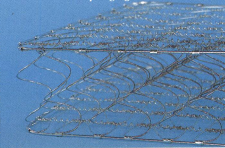
5. Distribution of springs: Some beds have firmer springs through the centre third of the bed, while others have a softer 'zone' of padding in this area. Manufacturers of both say their design gives needed support to heavier areas of the body to ensure proper alignment of the spine. These variations will cost more but it's difficult to confirm whether they actually add to the standard of support offered by the mattress.

Some manufacturers also include side or edge support springs, supposedly to enhance firmness around the edges of the mattress and maximise the area of the mattress you can use for comfortable and supported sleep. It is also claimed the edge supports give a feeling of secu-

'Hourglass' Bonnell springs



Continuous-coil springing



rity if a person rolls close to the edge of the bed in their sleep, and ensure an even firmness over the whole surface of the bed. The supports are also supposed to protect against the spring and comfort systems breaking down around the edge of the bed, which is deemed to be a major cause of mattress failure.

Don't be misled by salespeople who insist one of the above factors, perhaps "coil count" (the number of springs), is the sole determinant of a bed's softness/firmness. A high coil count doesn't automatically mean it's a better product. The number of springs, wire gauge, spring shape or number of active turns are of no relevance on their own, but together they can give you an indication of a bed's support and durability.

Aim for the following combination: a high number of springs in the shape that will give you the level of firmness you desire, made from a low-gauge wire with a high number of active turns and side support springs. Special "zoning" is a matter of personal preference.

Padding and fluff

To get the longest life and best possible support from your bed, look for superior padding and upholstery materials in the **comfort layer**. This is the layer between you and the springs. Mattresses can be made softer or harder by using different types and amounts of comfort fillers.

Exotic fills such as silk, wool, high-grade foams, latex, horsehair, sisal (fibre used for making ropes) and high-grade cottons are used in more expensive beds. Cheaper fillings include lower grades of foam and less foam, reclaimed fabrics (cotton tailings broken into fibre again and then 'needled' down into flat form to resemble felt pads) and coconut fibre.

The first layer under the mattress cover makes a big difference between a soft and a firm bed. If reclaimed fabric pads or latex are used directly under the cover, for instance, the mattress will be

firm. A softer bed is provided by placing layers of foam directly under the cover.

Consider the durability of the materials used. Cotton gets firmer as the years go by and foam gets softer. Coconut fibre is known to break down and can 'pocket' or become compressed into the springs. The gradual breakdown of all filling materials causes your body to get closer and closer to the springs, resulting in the bed becoming less comfortable.

The way in which the padding is secured in place will also influence how well the bed maintains its comfort. In better mattresses, each layer of padding is hand-stitched into place to prevent the filling materials from shifting around. Retailers should know which mattresses have been hand-made; they will be more expensive than machine-made models.

Many consumers make the mistake of basing their purchasing choices on the appearance of the outer covers. This is probably the least important feature of the mattress, but the type of fabric used will have an impact on price. The least durable mattresses will usually have flat cotton covers. Quilted damask covers (linen, silk, cotton or wool fabric woven with patterns) are likely to last longer. The more colours you can see in a damask and the more intricate its pattern, the higher its quality.

Good foundations

The base or foundation performs the following functions:

- Adds durability to the mattress by acting as a shock absorber
- Holds the mattress off the ground.

There are two different types of base sold with innerspring mattresses to form bedding ensembles. Both look similar from the outside — they're usually covered with a damask or cotton to match the mattress, but one type is basically a rigid, covered-in wooden box with wooden slats, while the other contains springs secured to a base layer of wooden slats and is more expensive.

Some manufacturers believe a sprung base is an integral part of the bed because it will absorb up to 30% of the sleeper's weight. They claim timber bases are little more than "an empty packing case with ticking". Others don't believe one type is any better than the other and claim some of the most expensive mattresses come with a rigid timber base.

Beds also come with exposed wooden or metal frames with legs and metal or wooden slats taking the place of the ensemble foundation. The opponents of covered-in wooden bases argue that these frames, because they are rigid, are no better than the covered-in timber bases and can shorten the life of a mattress. □

BED CARE

THE FOLLOWING tips will help you care for a new mattress and base set to ensure it has a long life.

■ Turn your mattress over or around each month. This will even out the slight body impressions that sometimes develop as the upholstery settles.

■ Folding, bending, standing on or jumping on the mattress puts excessive strain on the component parts and can damage the mattress and foundation.

■ Use a mattress protector to avoid soiling.

■ Vacuuming is the only recommended cleaning method but if you're determined to tackle a stain, use mild soap with cold water and apply lightly.

■ Manufacturers advise not to use an old sprung foundation with a new mattress. If your old mattress is past it, chances are the health of the spring system in the base will not be any better. They say putting a new innerspring mattress on an old sprung foundation may result in the mattress wearing out faster, so check your base as well for signs of wear when you buy a new mattress.

BACK CARE

CONSIDER the following points if you suffer from back pain. Sleep is the time when your body recuperates or recharges its batteries. If you're sleeping on a bed which is too soft, the muscles may not get the support they need during sleep, and thus the recharging process is interrupted because the muscles have to continue to work to support the body and cannot relax. Again, if the bed is too soft or sags there is strain on the lower back, which can aggravate an existing lower back condition. The bed should mould to the shape of your body and support it (see *This bed's too hard* on page 20 for more information).

Even with the right type of bed many people aren't getting the rest they need because they don't sleep the right way. Consult your doctor about the sleeping position most appropriate for your particular back problem.

The type, height and shape of the pillow are also important. It should be reasonably firm, as distinct from a feather or down pillow, and the height should put your head in line with your body.

The 'comfort layer' is the soft bit between your body and the springs — what it's made of can make all the difference to the 'feel' and durability of a mattress.



WATER HEATERS

The best sort of water heater is one you can forget about — it doesn't give you a bracing cold shower when you're least expecting it; you don't get a nasty shock when the gas or electricity bill arrives; and you're not constantly calling out service people because of breakdowns.

That, in a nutshell, is what this article's about — choosing the water heater that's best for you. We look at the types of water heater available; bring you the results of a test of several gas and electric models; and pass on the experiences of 1500 subscribers concerning reliability.

Tests of electrical heaters involved transforming a tiled area with taps and sinks in one of our labs into a hotbed of monitoring and data gathering. As the heaters were installed, a number of instruments were attached to them — to measure the amount of electricity used, the flow of the water and the temperature of the water coming into the tank and leaving it. All these instruments were connected to a computer which stood in for a family using hot water for showers, the washing machine, the washing-up and so on. Once set up, it switched taps off and on and, while the heaters did their bit, it read and recorded a host of information.

The gas water heaters were tested for us by the Gas & Fuel Corporation of Victoria.

WE TESTED seven models in all, representing five different kinds of water heater that together make up the majority of the market:

- Electric off-peak storage.
- Electric continuous storage.
- Gas storage.
- Gas storage, high-efficiency.
- Gas instantaneous.

TYPES NOT BRANDS

We decided to do a type test rather than a brand test in this case because there are more significant differences between types of heater than between brands. We didn't include the electric instantaneous type because it's a very small portion of the market (and see later for why we didn't test solar heaters either).

Eighty per cent of the market is for storage-type heaters (both gas and electric) rather than instantaneous, and the brand names RHEEM, VULCAN and HARDIE-DUX account for 90% of these. VULCAN and RHEEM have the same parent company.

The brands and models we tested as representatives of their type were:

- HARDIE-DUX HDE 315 TE NS twin-element electric off-peak storage.
- VULCAN 6810 L twin-element electric off-peak storage.
- RHEEM 142315 twin-element electric off-peak storage.
- RHEEM 101160 electric continuous storage.
- RHEEM 31N/170 gas storage.
- RHEEM 38N/170 high-efficiency gas storage.
- RINNAI Infinity 20 gas instantaneous.

We tested the RINNAI model as a representative of a relatively new, more sophisticated type of instantaneous heater — the features on this model are expected to become standard for this type. It worked out the best for the environment, but its high purchase price means it remains a more expensive gas option.

RELIABILITY

We asked subscribers to fill in a questionnaire about their hot water systems and received around 1500 replies. We'd hoped this would enable us to say which brands were most reliable, but we don't have quite enough responses for each



brand to be able to report on them accurately enough.

What we can say is:

■ As a general type, gas emerged as slightly less reliable than electric and solar. One in four gas system owners reported one or more faults in the past year compared to only one in five electric or solar heater systems, although the faults in gas systems were generally minor (such as the pilot light going out) and cheaper to repair.

■ Most heaters that were replaced had worn out. But compared to gas and electric heaters, more solar ones were replaced because of expense of repair. Compared to any other group, more electric heaters were replaced because of running costs. Based on the results of our test, these are likely to have been electric continuous storage heaters.

■ We asked respondents how satisfied they were with various aspects of their current system. Solar heater owners were

more satisfied compared to gas and electric in terms of installation and type.

SOLAR

We didn't test solar heaters because they were too expensive for our budget.

According to Solahart, a major supplier of solar heaters, 5% of water heater installations in Australia are solar. While the benefits to the environment are obvious — no burning of fossil fuels so no pollution and no CO₂ production — most people still balk at the price. Units start at just under \$2000 and cost from \$300 to install. Manufacturers claim solar heaters can reduce your energy bill by 80% and in some areas will pay for themselves over four or five years. The exact saving may depend on your usage and the efficiency of the model you choose more than location. On average, solar water heaters require boosting by gas or electricity 20–25% of the time during a year.

The newer units have a claimed lifespan of 15–20 years, and some carry warranties for this period. As noted, cost of repair was a notable factor in people buying replacement heaters so such warranties would be welcome.

THE RESULTS

There is no 'Best Buy' type of water heater for all situations, as the cost of electricity and gas differs around the country. However, generally speaking where off-peak electricity is available it's the most economical option taking into account purchase price of the heater, running costs and interest foregone on the purchase price, except in Adelaide and Perth where a high-efficiency gas storage heater is cheaper. Electric continuous water heaters are far and away the most expensive option. See *How to choose a water heater* overleaf for more detailed information on individual cities.

TYPES OF WATER HEATER

GAS STORAGE

Water is heated in the tank and stored at a preset temperature till required. As water is drawn off at the top of the tank, cold water enters at the bottom and warmer water moves upwards, leaving a layer of colder water behind at the bottom of the tank. The drop in temperature is picked up by the thermostat, which triggers the gas burner to heat the water.

If the heater can't keep up with the amount of water being drawn off (and so the volume of cold water entering), the cold layer could move as high as the outlet pipe at the top of the tank — the result being cold water.

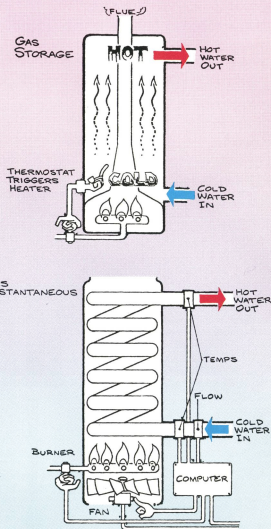
HIGH-EFFICIENCY GAS STORAGE

The principles are identical to the ordinary gas storage water heater, but it has an improved heat exchanger design so the gas burner heats the water more efficiently; the actual mechanism can vary. A high-efficiency gas storage heater would carry four or more stars on its energy label.

GAS INSTANTANEOUS/CONTINUOUS FLOW

Cold water enters the heater when you turn the tap on and is heated as it passes through a 'fin' system much like a car radiator. Earlier models had no thermostat, and the water temperature was dependent on flow — if the tap was only just on, the water was piping hot; the more you opened the tap (thus running more cold water past the heating element), the cooler the temperature became. Better models now have thermostats, so unless more water is being drawn than the heater can cope with, the temperature remains constant — but if, for instance, two showers and the dishwasher are all going at once, the heater will still not be able to heat the increased volume of water in the time it takes it to travel through, so the water may be lukewarm.

In more sophisticated models, such as the RINNAI we tested, inlet and outlet temperatures are monitored, as are flow rates. These monitors are connected to a computer which controls the heating level and to a fan which forces air through the gas burner and heat exchanger, thus improving its capacity to heat. One advantage of all instantaneous systems is you never run out of hot water, "a boon to those with visitors", as one of our journalists enthuses.



SCALDING: A BURNING ISSUE

HOT WATER BURNS. In Australia, these burns result in 400 to 500 hospitalisations and 10 deaths every year. The most vulnerable are young children and infirm, elderly people. Many of the accidents could have been prevented by even small reductions in the water temperature.

The traditional argument for storing water at 60°C or above has been as a protection against legionella bacteria. But the number and severity of accidents are fuelling a debate on whether this position is justified. The Child Accident Prevention Foundation is among those calling for a reduction in water temperature at the outlet.

The risk of catching legionella from domestic hot water systems is small. In fact there are no reported cases recognised as due to domestic systems.

The electric water heaters we tested

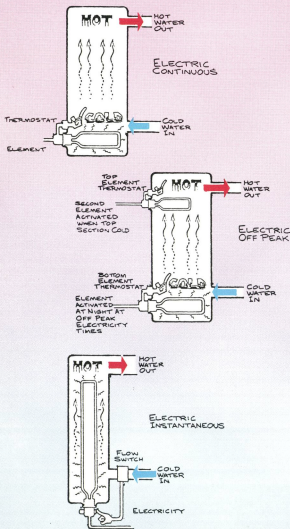
had running temperatures of between 64°C and 70°C. Even at the lower temperature, it only takes a couple of seconds to produce a full-skin-thickness or third-degree burn. In other words, the normal reflex reaction would not be fast enough to prevent a serious burn. The gas heaters tested for this story, on the other hand, run at temperatures between 54°C and 59°C when the thermostat is adjusted to the 'normal' position. This means it takes 30 seconds and about 10 seconds respectively to cause a full-thickness burn.

The temperature of the electric heaters we tested couldn't be adjusted by the user (in fact most couldn't be adjusted at all), but that of all the gas heaters could. Another solution is to install thermostatic mixing valves. These don't interfere with the temperature in the tank, instead they add cold water near the tap — useful for

taps in the bathroom and kitchen, but not necessary for taps leading into washing machines. Unfortunately thermostatic mixing valves are not a cheap option — each unit costs between \$450 and \$700, and installing it could cost between \$200 and \$600, depending on the complexity of the job.

The overwhelming majority of subscribers in our survey (85%) thought user-adjustable thermostats were desirable. 75% of those who had one used it.

If you can adjust your water temperature, what should you set it at? The NSW Health Department, which has been reviewing an Australian Standard, now recommends 50°C as a balance between the risks of scalding and legionella. It is also talking to manufacturers about promoting user-adjustable thermostats.



ELECTRIC CONTINUOUS STORAGE

This operates on the same principle as a gas storage water heater. The element heats the water whenever it is colder than the preset temperature. When all the hot water is used up the heater can't heat the new water quickly enough, so the water at the outlet will be cold.

ELECTRIC OFF-PEAK STORAGE

The tank of water is heated at night when electricity is cheaper. There are two kinds of off-peak water heater:

■ Electric off-peak single-element

One element at the bottom of the tank does the heating, and only at night. So if you empty the tank, you have to wait till the next night for it to reheat. The key factor is therefore the total amount of hot water used in a day.

■ Electric off-peak twin-element

Water is still heated at night at cheaper rates, but a second element at the top provides a back-up supply of hot water should the tank be emptied during the day. A small portion of water at the top of the tank is thus kept hot, but the full tank is not reheated till the night. This second element may work with standard-rate electricity, so if you rely on it too much (which means you have a heater which is too small for your needs) you may not get the cost benefits of the off-peak electricity. Each supplier has a different billing structure for this second element, so if you're thinking of buying a twin-element heater and are unsure what size to get, check with your local supplier what rates will apply to this second element.

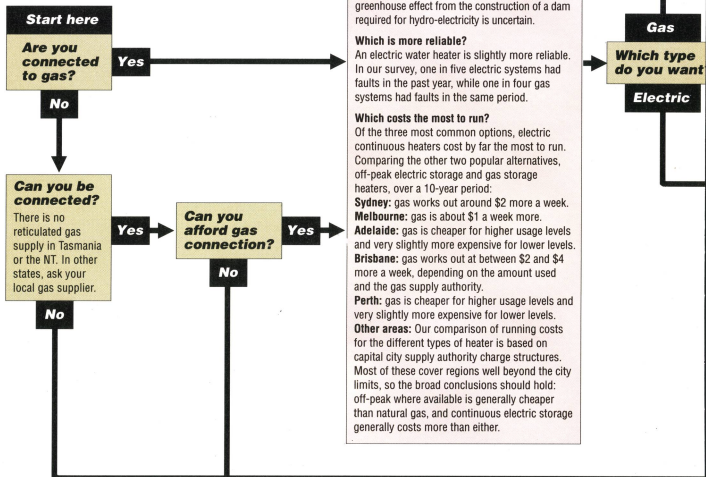
ELECTRIC INSTANTANEOUS

This can provide hot water round the clock by using an element to heat water as it flows past, but is limited by its flow rate — the volume of hot water it can heat at any one time. Depending on the size of the element, an instantaneous heater may fail to deliver if, for example, the washing machine and two showers are going at once.

Older versions gained a bad name for limited flow and a temperature which varied with flow — as with gas instantaneous heaters, if you turned the hot tap on full, the temperature went down. Newer systems have better temperature control. As with gas instantaneous water heaters, you never run out of hot water.

HOW TO CHOOSE A WATER HEATER

This chart applies to gas and electric systems only, drawing on the results of our research and testing.



Choosing between gas and electric

Which is cheapest?

Electric off-peak is the cheapest when purchase price, running costs and interest foregone on the purchase price are taken into account over 10 years. This is true for all major cities except possibly Adelaide and Perth, where for higher water usage gas is cheaper. Options are more limited in Hobart (no reticulated gas) and Darwin (no off-peak electricity rates or reticulated gas).

Which is least damaging to the environment?

When you consider overall efficiency (that is, how much of the fuel source is converted directly to energy as opposed to being wasted in the process), gas is more efficient than electricity. There is a similar bias regarding CO₂ production, with electricity generating three times as much as gas for the same quantity of hot water. This may not be true for Tasmania, where electricity is hydro-generated. However, the contribution to the greenhouse effect from the construction of a dam required for hydro-electricity is uncertain.

Which is more reliable?

An electric water heater is slightly more reliable. In our survey, one in five electric systems had faults in the past year, while one in four gas systems had faults in the same period.

Which costs the most to run?

Of the three most common options, electric continuous heaters cost by far the most to run. Comparing the other two popular alternatives, off-peak electric storage and gas storage heaters, over a 10-year period:

Sydney: gas works out around \$2 more a week.

Melbourne: gas is about \$1 a week more.

Adelaide: gas is cheaper for higher usage levels and very slightly more expensive for lower levels.

Brisbane: gas works out at between \$2 and \$4 more a week, depending on the amount used and the gas supply authority.

Perth: gas is cheaper for higher usage levels and very slightly more expensive for lower levels.

Other areas: Our comparison of running costs for the different types of heater is based on capital city supply authority charge structures. Most of these cover regions well beyond the city limits, so the broad conclusions should hold: off-peak where available is generally cheaper than natural gas, and continuous electric storage generally costs more than either.

What kind of gas heater?

OPTIONS:

Storage, high-efficiency storage, instantaneous.

DECIDING FACTORS:

Which is cheapest overall?

High-efficiency gas storage is cheapest when you take into account purchase price, running costs and interest foregone on the purchase price over 10 years.

Which is best for the environment?

Gas instantaneous is the least damaging, but the difference is not so marked between types of gas water heaters as between gas and electric.

What is the difference in running costs?

Averaging out the costs between states, electronic gas instantaneous heaters like the RINNAL we tested work out over \$1 per week less than gas storage.

Which will suit me better?

You need to consider the limitations and strengths of each type of heater, as described in *Types of water heater* on pages 24–25, to work out which is likely to best meet the needs of your household.

What kind of electric heater?

OPTIONS:

Continuous storage, off-peak single-element storage, off-peak twin-element storage, instantaneous.

DECIDING FACTORS:

Which is the cheapest overall?

An off-peak electric heater is the cheapest, taking into account purchase price, running costs and interest foregone on purchase price over 10 years.

Which is better for the environment?

There's not much between electric systems in terms of energy efficiency and CO₂ production. They are all inferior to gas systems in this respect, except perhaps in Tasmania, which has hydro-electricity.

What is the difference in running costs between off-peak and continuous electric storage?

With high usage levels, electric continuous heaters work out significantly more expensive: they cost about \$8 more a week. The difference is not so great with light use — around \$3 a week more. There is no off-peak electricity in the NT.

Which will suit me best?

Refer to *Types of water heater* on pages 24–25 for the pros and cons of the different types, to work out which is likely to best suit the needs of your household.

What size do you need?

What size?

The chart below shows the size of storage water heater you need.

Size required	Number of people in household							
	1	2	3	4	5	6	7	8
Gas storage								
170 litres				•	•	•	•	•
135 litres		•	•	•	•	•		
90 litres		•	•	•				
Electric off-peak storage								
400 litres					•	•	•	•
315 litres			•	•	•	•	•	
250 litres			•	•	•	•		
160 litres		•	•	•				
Electric continuous storage								
250 litres					•	•	•	•
160 litres			•	•	•	•		
125 litres			•	•	•	•		
80 litres			•	•	•			

Factors to consider include:

■ The number of people in your household and the number of appliances. When using the chart, an appliance such as a washing machine or dishwasher counts as one person.

■ If your household has a weakness for long showers or deep baths, opt for the larger model where there is an overlap of recommended sizes. Drawing on the results of our survey, it seems, independent of heater size, that the larger the household, the more likely you are to run out of hot water. The moral? Don't underestimate your hot water needs.

■ Most gas and electric water heaters are available in versions which can be installed either outside or inside, but check — the gas instantaneous model we tested was external only.

■ As the types of heater work on different principles, the tank volume varies. Off-peak electric heaters, for example, are larger than continuous ones as they are intended to store a whole day's hot water supply. You may also need to bear in mind the space you have for the heater. Instantaneous models are the smallest, but the improved versions are not necessarily a cheap option — the late-model instantaneous gas heater we tested, for example, had a very high purchase price (over \$1500 when we bought).

■ Electricity suppliers usually set a minimum size of off-peak twin-element heater for a particular household size to avoid excessive use of the second, boosting element during peak hours — ask your supplier what it recommends for your situation.

■ Manufacturers can also help you choose the right size. The chart is a summary of information for Rheem and Hardie-Dux electric heaters. The information should be correct for other electric heaters but may differ slightly from brand to brand within gas heaters.



DRIVELINES

CRASH TEST UNFAIRLY CRITICISED

Providing information to consumers often incurs the wrath of industry, and the car industry is no exception.

CAR INJURY RATINGS

Car model	Driver's head (HIC)	Passenger's head (HIC)	Driver's chest (mm compressed)
VOLVO 940 GL	490	600	48
MAZDA 626 LXI	1160	930	49
TOYOTA Camry Executive	1090	1240	41
FORD Falcon EB S2 GLI	1340	780	54
HONDA Accord	1500	1330	51
MITSUBISHI Magna TR Executive	1140	1580	51
NISSAN Pintara PR Executive	1750	890	44
SUBARU Liberty LX	1360	1810	54
HOLDEN Commodore VP Executive	1690	2410	52

■ Serious injury unlikely ■ Serious injury possible ■ Serious injury likely

So what's all the fuss about? This table is based on the results of the New Car Assessment Program described in this article. The figures were calculated using special test dummies in cars being crashed at a speed of 56 km/h. The dummies are used to measure movement of and forces acting on the head, chest and legs. The most serious injuries were to the head and chest of the driver and the head of the passenger. We have ordered them according to the worst injury possible, which was in all cases to the head of the driver or the passenger. The Volvo is more expensive than the other cars in the test but was chosen as a benchmark vehicle to show what effect an airbag can have in an accident.

The figures for the head are calculated on sudden shocks to the head (for instance, hitting the steering wheel) and are called the head injury criterion (HIC). The highest figure (recorded on the passenger in the Commodore) was a result of hitting the dashboard above the glovebox. The driver-side airbag in the Volvo prevented the dummy's head striking any solid objects and as a result it had the lowest figure for head injuries.

Based on overseas results, the figures can vary from test to test by 20% to 30%. Generally, though, an HIC of 1000 means roughly one in six crash victims may have a life-threatening skull fracture or brain damage, and an HIC of over 2000 means nearly all victims could experience life-threatening head injuries resulting in either death or long-term disability.

Head injury criterion figures of 750 or less mean brain damage is unlikely. Figures over 1250 mean brain damage is likely as a result of the impact.

The chest injury figures measure how far the chest was compressed in millimetres. Serious injury is possible if the chest is compressed by more than 50 mm, usually a result of hitting the steering wheel or other fittings in the car. In five cars, the driver's chest was compressed fractionally more than this, with the drivers in another two cars coming close to this figure. The range for compression of passengers' chests was 34 mm to 47 mm.

The forces on the legs were unlikely to cause injury in all but one case so haven't been included in the table here. The exception was the Ford Falcon, where the driver's right leg could possibly have been injured by striking the fuse box and the right side of the steering column.

IN APRIL this year the first results of the New Car Assessment Program (NCAP) were released. They were greeted with threats of legal action from one of the car companies and aggressive headlines from some motoring journalists like "Crash test figures lie" and "Anger at the 'ambush' is justified".

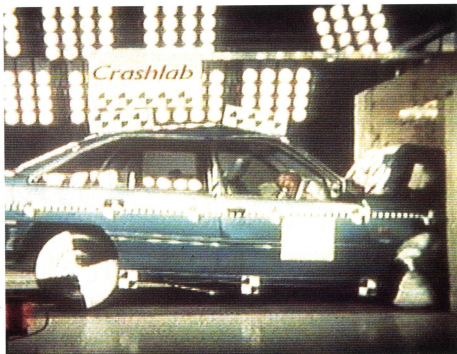
For those who missed it, NCAP is a program funded by the transport departments of NSW, Victoria, Queensland and South Australia along with all the state motoring organisations. They bought nine cars anonymously (in true CHOICE style) and crashed them at speeds higher than those defined by the proposed Australian Standard (56 km/h as opposed to 48 km/h). The results (see the table on the left) don't prove the cars involved are safe or unsafe but they clearly show some cars perform much better than others in this type of crash.

The criticisms of the results were in essence that the tests did not mirror real-life experience and testing one sample of a car model is statistically unreliable.

The Federal Chamber of Automotive Industries said in its press release that the NCAP tests represented only 2% of real-life accidents causing serious injury or death. This figure was repeated in a number of reports and was obviously intended to make the tests look unrepresentative, but if you're not so pedantic about the exact speed of the crash a different story emerges.

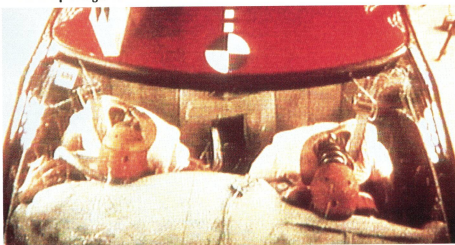
According to a 1991 report from Monash University, around 65% of crashes are frontal impacts. The average speed is approximately 45 km/h, but around a third are at speeds faster than 56 km/h. This is also the speed at which a similar US program crashes cars, allowing NCAP to compare its results with a larger database.

A number of reports criticised the choice of a full-frontal impact test when according to the same Monash University figures roughly two thirds of frontal



'Head injury criterion' (HIC) readings for the Holden Commodore (above) indicated brain injury was likely for the driver and passenger in full-frontal crashes at 56 km/h.

The HIC for the Subaru Liberty (below) also indicated brain injury was likely for both driver and passenger under the same test conditions.



accidents are some sort of offset impact (where the impact isn't distributed evenly over the front of the car). Michael Griffiths, spokesperson for the NCAP program, said it was well known to the vehicle industry and most journalists that NCAP would include offset impact tests as well as full-frontal tests in future, but virtually all the motoring journalists chose to ignore this.

Then you have comments like, "At the moment, it just looks like the local car makers have been ambushed."

The journalist who wrote it, along with many others, ignored the fact that each manufacturer was allowed to view the test on their car, and was given the complete results of the test for their car

and the opportunity to discuss them further.

According to Michael Griffiths, this helps negate the criticism of testing only one sample. He said if the manufacturers could prove with their own test results that the sample NCAP tested was not representative of that model of car, it would have been taken into account. Two manufacturers queried the results but Griffiths said the differences could all be accounted for.

The good news for consumers is the New Car Assessment Program will continue. The next lot of results should be out in late October and will cover around 10 small cars; offset impact results will be included in the assessment.

SLOW-SPEED CRASHES

If the car companies get uptight about high-speed crash tests, you think they'd be over the moon with crashes done at 8 km/h. Not so when the point of the test is to highlight the repair costs for cars in low-speed crashes. The insurance company AAMI released a report last year that showed you could easily spend \$3000 if you backed into a pole at just 8 km/h.

AAMI commissioned the civil engineering department at Monash University to conduct two tests on five small cars, one forward at 8 km/h into a solid barrier and the other backwards at 8 km/h into a steel pole. The damage was quite significant, mostly to the bumpers and nearby panels but also cracked headlights in one case and a smashed rear window in another.

The cars were then taken to a range of repairers for quotes. The average cost of the forward accidents ranged from \$640 to \$2100. The rear accidents were more expensive (\$1800 to \$3200) because the force of the impact was more concentrated.

The tests were similar to those done regularly by the US Insurance Institute for Highway Safety (IIHS), and looking at comparable models from both tests it appears the US models all performed much better. This is probably because the US has a Standard for bumpers requiring cars to incur no damage in a 4 km/h accident. It seems that, given enough pressure, car manufacturers can make their cars able to withstand minor accidents.

As with the New Car Assessment Program, the Australian manufacturers complained the AAMI tests weren't relevant because they were at higher speeds than the US standard. However, the US used to have an 8 km/h standard until 1982, when it was reduced to 4 km/h. The IIHS says many manufacturers subsequently introduced weaker bumpers and its tests have shown that since then the repair cost of an 8 km/h accident has increased significantly for almost all cars.

The IIHS also points out that the reasons given for reducing the speed requirement of the US Standard (the increased repair bills would be offset by cheaper bumpers; the weight savings in cheaper bumpers would make cars more fuel-efficient, etc) have since been discredited. While there was no noticeable decrease in car prices following the introduction of the weaker bumpers there was a significant increase in insurance payouts. There was also no average decrease in bumper weights so no fuel efficiency savings either. □

ANTIBIOTICS

They save lives and decrease suffering, but if misused antibiotics can also put our health at risk.

ANTIBIOTICS ARE DRUGS which kill or stop the growth of bacteria that cause infections. Since their development diseases that were once big killers, like bacterial meningitis, have been successfully treated. But these drugs have also become among the most misused.

Their widespread use in hospitals has resulted in strains of 'super' bacteria which are no longer affected by many antibiotics, which in turn has created an ever-increasing need for new drugs. This situation poses great public health risks — if a strain became resistant to all available drugs we'd no longer be able to control the diseases it causes — and has

also contributed to the increasing costs of health care.

From a consumer's point of view, inappropriate use of antibiotics or misuse in the way you take the drug can compromise their effectiveness and have adverse effects on your health.

How they work

Around 100 different antibiotics have been developed for use in treating disease. They only work on infections caused by bacteria and some other micro-organisms; they don't work on viruses. Some of the illnesses they treat would be very serious, even life-threatening, without them.

There are six main groups of antibiotics prescribed by GPs, which are effective against different species of bacteria (penicillins; tetracyclines; sulphonamides and trimethoprim; cephalosporins; erythromycins; and quinolones). They work in a range of different ways. The group that includes penicillin, for example, causes the cell wall of growing bacteria to weaken and rupture. Another group destroys certain species by blocking essential metabolic steps.

Some are effective on a wide range of bacteria — known as broad-spectrum antibiotics — while others target just one or a few types. Many common illnesses can be caused by more than one type of

TAKING ANTIBIOTICS

Don't always expect antibiotics from your doctor

Antibiotics are only useful if you have a bacterial infection — they won't help for viral illnesses like colds, flu and most sore throats. Let your doctor know you only want to take them when it's really necessary. There aren't any 'natural' alternatives, but many infections for which antibiotics are prescribed in general practice will get better without treatment, and for most people, it's not a good idea to take them 'just in case'.

Tell your doctor if you think you're allergic to penicillin

If you've ever had a reaction like a rash or wheezing when taking it previously, describe what happened. Allergic reactions can be life-threatening.

Take them at the right time

Some antibiotics won't be absorbed properly if taken with or near food; others are more likely

to irritate your stomach if taken on an empty stomach; with others still, food makes no difference so they're best taken at evenly spaced intervals throughout the day. It's important to follow the doctor's instructions about when to take the drugs. If it's not specified, check with the pharmacist.

Watch out for side effects

Side effects are quite common, though usually minor. See *Side effects*, opposite, for more information.

Tell your doctor if you're taking other medicines

Antibiotics may interfere with the way other drugs act. Some reduce the effectiveness of the contraceptive pill. Anticoagulants are also sensitive to other drugs, including antibiotics.

Take the full course

If the antibiotics were necessary in the first place, it's important to take the full course, even if you start to feel better before it's finished. If you don't you may not fully kill off the bacteria causing your illness, and so relapse. If you're still not well at the end of the course, go back to the doctor. You may need a repeat dose or a different antibiotic.

bacteria, so ideally doctors should recognise which type is involved so they can prescribe the most effective and narrow-spectrum antibiotic.

Misuse

Antibiotics are among the most commonly prescribed drugs in Australia. More prescriptions are dispensed for the antibiotic amoxycillin than any other drug, and two other antibiotics make it into the top ten list.

Australians use twice as many antibiotics per head of population as Swedes, and more than people in the UK and North America. Experts think we use them too often and in inappropriate situations. Surveys have found some GPs prescribe antibiotics when they won't be of any use — such as for illnesses that are primarily viral — and often use broad-spectrum antibiotics where a narrow-spectrum drug would have been better. They are also commonly given for minor bacterial infections that would get better without treatment. Even when they are appropriate, patients are often not given the best one for their illness.

One reason some doctors over-prescribe antibiotics is that it's difficult to tell whether certain illnesses are viral or bacterial. Because some bacterial infections become much more serious if not treated early, some doctors err on the side of caution and prescribe antibiotics just in case it is bacterial.

Another reason is patient pressure. Many people expect doctors to give them a pill for every ill, and see antibiotic use as a simple equation: if you're ill you take antibiotics and get well. But like many drugs antibiotics come with risks and adverse effects. When these are added in, the decision to use them is not as clear-cut.

Resistance

There's a long list of antibiotics which once destroyed certain species of bacteria but now have no effect on them. Antibiotics were originally derived from natural sources, such as substances found in soil and plants, so even before we began to use them in medicine, some bacteria had adapted themselves to be less sensitive to them. In the fifty-odd years antibiotic drugs have been in use, this process has speeded up dramatically, and micro-organisms have evolved in an array of ingenious ways to outsmart the drugs. Many now produce an enzyme which destroys some antibiotics, or develop thicker cell walls which prevent others penetrating.

The more a particular antibiotic is used, the more likely it is that resistance to it will develop. Once resistance is widespread, the drug is useless. This is particularly a problem in hospitals where antibiotics are used so often, and in developing countries where misuse is more common due to poverty and less

control over drug use (people often can't afford a whole course of antibiotics but can buy a couple of days' worth from a 'briefcase pharmacy').

So far, researchers have come up with new drugs to replace those made ineffective. However, there's great concern about what will happen if medical science fails to keep pace with the bugs. In Australia, the bacterium *Staphylococcus aureus* — known as golden staph, and causing a range of diseases including pneumonia, wound infections and abscesses — has already outwitted a range of penicillins, and strains resistant to most other antibiotics are emerging, sometimes only a few years after the new drugs were introduced.

By making established drugs ineffective, resistance is also a very expensive problem. One estimate puts the cost of developing a new drug and getting it onto the market at around \$230 million.

Some resistance is inevitable — some bacteria will always find ways to mutate or adapt — but by being careful about the way we use antibiotics we can reduce how quickly and widely it occurs (see *Reducing the risks overleaf*).

Side effects

Between 10% and 20% of people taking antibiotics will experience side effects. Some people have an allergic reaction to antibiotics, particularly penicillin, which occasionally can be life-threatening. If

Throw out any unused antibiotics

If you have any around the house don't keep them with the idea of using them in future. Self-prescribing in this way can be dangerous. In particular, never give children antibiotics unless recently prescribed for them by a doctor. Also, some antibiotics deteriorate over time, and the products they break down to can be toxic.

Should you avoid alcohol?

While it's generally a good idea to avoid alcohol when you're taking prescription drugs and fighting off infections, a moderate intake usually isn't a problem. But you certainly shouldn't drink in excess. Some antibiotics (eg metronidazole) have an effect that can stop alcohol being metabolised properly, which would make you violently ill — so read any information which comes with the drug or check with your doctor or pharmacist.

Children

Children and babies aren't at any greater risk from antibiotics than adults, and can get the same benefits. The side effects are not necessarily more severe, except in very young infants. Some antibiotics should not be given to children — tetracyclines, for example, cause permanent discolouration of their teeth — and doctors should never

prescribe them. Establish a good relationship with your doctor so he or she knows you only want your child to take antibiotics when they are really necessary, and will discuss the risks and benefits with you.

Pregnant women

Pregnant and breastfeeding women can use some antibiotics safely when they are necessary. Certain types have a well-established safety record (such as penicillins), but others can be harmful to the foetus and need to be avoided (eg tetracyclines). Remind your doctor if you are pregnant, trying to conceive or breastfeeding, to make sure you are given the safest appropriate alternative.

The elderly

Elderly people need to avoid some types of antibiotic. For example, many older people have some degree of renal failure and tetracyclines can bring on acute failure. Doctors will take this into account when prescribing. The very elderly or frail may also suffer more from side effects. They generally already have lower levels of beneficial bacteria in their digestive tract, so should seriously consider using yoghurt or bacteria supplements (see *Avoiding side effects overleaf*).

you've ever had an immediate reaction or developed a rash or hives when taking antibiotics you must tell doctors about it when they are prescribing antibiotics.

Usually, however, side effects are fairly minor — nausea, loose bowels, a bad taste in the mouth, for example. But they can be more serious: severe diarrhoea, vomiting, vaginal thrush. (See *Some possible side effects of specific antibiotics* below for which ones are likely to cause certain effects.)

If the illness you're taking antibiotics for is serious or life-threatening, some side effects seem acceptable. But if they've been prescribed for a minor infection which would probably clear up on its own, the side effects might result in more discomfort than the infection itself.

Superinfection

Taking antibiotics to cure an infection in one part of the body can also cause another somewhere else — a **superinfection**. The aim of antibiotic therapy is to reduce the number of disease-causing bacteria at the site of the infection so your own immune system can finish them off. But it always kills other bacteria as well.

Our bodies are home to zillions of micro-organisms — bacteria, yeasts, viruses and protozoa — many of which are beneficial and others potentially harmful. Normally, large populations of beneficial bacteria keep the numbers of harmful bugs in check, so they don't cause problems. As antibiotics kill off beneficial bacteria along with the type causing the infection, there's often a population explosion of other micro-organisms, which may cause a superinfection. For example, it's fairly common for women to end up with vaginal infections caused by overgrowth of the yeast *Candida al-*

bicans after taking antibiotics, particularly broad-spectrum ones. Yeasts aren't affected by antibiotics, so when large numbers of bacteria are wiped out by the drugs they can multiply virtually unchecked. When antibiotics kill beneficial bacteria in the intestines, yeasts and other bacteria flourish, often resulting in diarrhoea and abdominal pain.

Broader-spectrum antibiotics do more damage to the normal balance of micro-organisms within the body than those that target a narrow range, so are more likely to lead to superinfections. You're also more likely to get a superinfection when you take antibiotics for a longer time.

Long-term problems

According to Dr Bob Pritchard, a clinical microbiologist at Sydney's Royal North Shore Hospital, extensive use of antibiotics can lead to a situation where the normal population of micro-organisms in the body never fully regenerates.

The environment these micro-organisms inhabit inside your body is very competitive. Different species compete for food and room on the gut or vaginal wall where they can attach themselves. The beneficial bacteria normally found in the intestines and vagina are very sensitive to antibiotics. They're the easiest to kill off so don't become resistant to the drugs.

When the good guys are repeatedly wiped out by antibiotics, less desirable bugs have a real advantage. If they take up all the attachment sites it can be very difficult for the good bacteria to re-establish themselves which, says Dr Pritchard, "can lead to an abnormal physiology", such as impaired digestion or vaginal discharge.

People who have to take antibiotics

for long periods — those with kidney problems or spinal injuries, for example, who tend to get recurrent infections — can also become colonised by resistant bacteria. This means when they do get an infection it's likely to be caused by resistant bacteria, so is much more difficult to get rid of.

Avoiding side effects

The best way to avoid the downside of antibiotics is only to take them when it's really necessary. You should take your doctor's advice on this, but it's a good idea to communicate to GPs that you want to be sure you need them.

When antibiotics are necessary, there's some support for the belief that taking supplements of *Lactobacillus acidophilus* and *Bifidobacterium bifidus* (beneficial bacteria naturally present in the body) or eating yoghurt containing these bacteria is helpful. The theory is that consuming extra beneficial bacteria replaces some of those the antibiotics kill off, so helps maintain the balance of normal bacteria in your digestive tract. The lactic acid in yoghurt is also useful as it inhibits the growth of yeasts. For more information, see *Yoghurt and 'probiotics'* in the November 1992 issue of CHOICE.

Reducing the risks

If prescribed and taken with the proper caution antibiotics should remain valuable weapons in our battle against disease. Although strategies are in place to reduce misuse of these drugs in hospitals and by general practitioners, and there's some evidence that the level of misuse is decreasing, it is still causing great concern.

Doctors should only prescribe antibiotics when they are necessary, not 'just in case', and never give them as a placebo. It's also accepted that the simplest antibiotic that's effective against an infection should be used so as to keep newer, more powerful drugs in reserve for use against bacteria proved or suspected to be resistant to older drugs. It's hoped this will slow down the development of resistance.

Consumers can also help. Not taking the full course when a doctor does prescribe them contributes to the development of drug-resistant strains of bacteria, as can taking antibiotics you have around the house, perhaps prescribed for someone else or an unused repeat course from a previous illness. See *Taking antibiotics* on pages 30 and 31 for some more dos and don'ts for safe and effective use of antibiotics. □

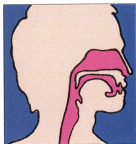
Some possible side effects of groups of antibiotics

	Penicillins	Cephalosporins	Tetracyclines	Sulphonamides and trimethoprim	Erythromycins	Quinolones
Rashes and skin reactions	✓	✓	✓	✓	✓	✓
Diarrhoea	✓	✓	✓	✓	✓	✓
Nausea	✓	✓	✓	✓	✓	✓
Vomiting		✓	✓	✓	✓	✓
Itching and joint pains	✓	✓				
Restlessness						✓
Headaches						✓
Fever	✓	✓				
Dizziness						✓
Jaundice	✓ (A)				✓	

(A) Particularly flucloxacillin and amoxycillin with clavulanic acid.

WHEN SHOULD YOU TAKE ANTIBIOTICS?

Upper respiratory tract infections



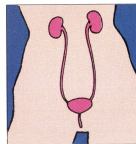
This kind of illness is one of five categories of infection for which GPs commonly prescribe antibiotics. They are useful only if the infection is caused by bacteria. At least 90% of upper respiratory tract infections are caused by viruses, so won't be cured by antibiotics. These include colds, flu and many sore throats.

Around 20% of sore throats are caused by the bacteria *Streptococcus pyogenes*, so antibiotics are appropriate for these. This is known as strep throat, and it's most likely in children aged between four and seven years.

The catch is that doctors can't tell for sure that it's strep throat without doing a swab and sending it to a pathologist. As it usually takes a couple of days to get the results back and the pathology bill will be greater than the cost of a course of antibiotics, most doctors will make a judgment based on their clinical experience. (There are kits which allow doctors to test for strep on the spot. They can be useful but it's often been found they aren't used properly so can be unreliable.) Usually, the more severe the sore throat, the more likely it is to be caused by strep. If it is, antibiotics can clear up the symptoms more quickly and prevent complications like rheumatic fever.

Sinusitis can also be caused by bacteria, and so sometimes responds to antibiotics. It will often clear up without antibiotic treatment, however, particularly if you are otherwise in good health. It can also be assisted by home remedies, such as steam inhalation.

Urinary tract infections



Antibiotics are effective against urinary tract infections, and are often necessary. If the treatment doesn't work it could mean resistant bacteria are involved and a higher dose or different type of antibiotic is required.

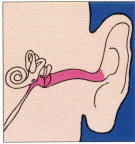
Infections of the lower urinary tract (cystitis) in women who aren't pregnant don't always need antibiotics. They can be fairly minor irritations of the bladder and, especially if caught early, will usually

get better without antibiotics if you drink a lot of water and take urine-alkalinising preparations (available over the counter at chemists).

It's worth trying this, particularly if you're prone to vaginal thrush. The antibiotics used to treat urinary tract infections are usually broad-spectrum so may result in thrush. If they are necessary, it may be better to use a thrush treatment as a preventive measure while you're taking the antibiotics.

Cystitis in non-pregnant women can also be treated with a single strong dose of antibiotics (rather than a course of smaller doses), as the drug is concentrated in the urine so will kill bacteria in the bladder and urethra. This reduces the risk of developing thrush. But for men, children and pregnant women, or when the infection extends to the kidneys, the drugs need to be taken for around two weeks.

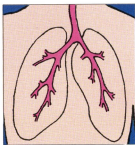
Ear infections



Young children often get earaches when bacterial infections cause inflammation of the middle ear. In mild cases associated with viral infections, the problem usually clears up without antibiotics. But in more severe cases, when the eardrum is red or yellow and bulging, antibiotics should be taken. Infections of the outer ear canal usually don't need antibiotic pills, but sometimes require topical treatment, such as an antibiotic cream.

Antibiotics are often prescribed to prevent ear infections in children with viral infections like colds, but there's no evidence to justify doing this.

Lower respiratory tract infections

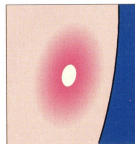


Many acute infections of the lower respiratory tract are viral, so won't be helped by antibiotics. Pneumonia and bronchitis can be caused by bacteria, and sometimes a secondary bacterial infection develops after you've had a viral one. If it's established these illnesses are bacterial and antibiotics are prescribed, it's particularly important to take the entire course. If you stop

taking them before the bacteria are fully eradicated you're likely to relapse.

Sometimes a bacterial infection will set in when your body is weakened by a viral disease. It can be a good idea to give antibiotics to people who are particularly vulnerable to these secondary infections — such as the frail or elderly and people with heart or lung disease — as a preventive measure when they have a severe cold or other virus. For this group, the risks associated with a secondary infection like pneumonia are greater than those of unnecessary use of antibiotics.

Skin infections



Skin infections are usually bacterial, most often caused by staphylococcus, so antibiotics will help. Minor problems like boils will often clear up without them.

One of the most widely used antibiotics for staph infections, flucloxacillin, was recently found to cause serious liver damage in some people. This side effect is rare and no safer alternative is as

effective on some infections, so it is still in use. However, it's a good example of the need to consider the risks and benefits before using antibiotics, and only use them when really necessary — in this case, for major staph infections, not minor problems like most boils.



GREEN PAGE

WONDER WORMS

RECYCLING with worms: it's a low-tech solution to our burgeoning household waste problem, with fringe benefits for your garden. It also has the potential to be used for commercial waste disposal.

You probably know by now that organic waste — food scraps and garden clippings — make up around half of the garbage householders put out each week. Composting this waste is one way to minimise the amount of rubbish going to landfill. But you could also feed it to the right kind of worms and let them turn it into a rich, natural fertiliser for you.

With a traditional compost heap, natural decomposition converts organic material into valuable humus in a few months. According to Douglas Darbyshire of Earthwhile Enterprises — an ACT-based company which grows and sells worms — using worms will give a better-quality compost.

Worms will eat virtually all the scraps your kitchen and garden produce and excrete a high-quality, organic plant food known as worm castings or vermicompost. The castings are not smelly and can be dug into the garden or added to pot plants as a soil enricher, used in potting mix and as seed starter.

Not any old garden worm will do the job, however. Manure worms — either Red/Blood or Tiger worms — are needed. While you may find some of these kinds of worm in your compost heap, it's unlikely they'll be in large enough numbers. Most households would need thousands of worms to get through the amount of organic waste they produce.

For those who don't want to get too earthy, a ready-made worm farm can make it very easy and clean.

Several different types are on the market. We looked at the Reln Worm Factory, which seemed particularly neat. The whole unit measures 49 cm high by 39 cm wide by 58 cm deep. It's made of 100% recyclable plastic and consists of four trays stacked on top of each other. The bottom one is a drip-tray which catches liquid manure. A tap on the side makes it easy for you to collect this in a

watering can to use as a liquid fertiliser, so there's no mess and no waste.

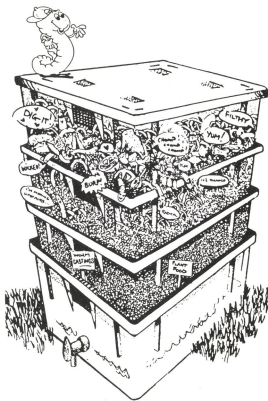
You place the first of the trays above the drip collection tray and establish the worms in this on a layer of bedding material. After a short time, you can start adding kitchen scraps. When the first tray is full, attach the second and begin filling it. A ventilated lid keeps the flies out and smells in.

When the worms have eaten everything in the first layer most will migrate up to the food in the second tray through the holes in its base, leaving the castings ready for harvesting, and the tray ready for more kitchen waste.

The Reln Worm Factory is compact, odourless and clean enough to fit on a balcony or in a laundry, as well as outside or in a garage. It's available from some local councils in Victoria and NSW, nurseries and worm growers for around \$50.

Worms are prolific breeders: to start off a worm farm yourself you'd need to buy around a thousand worms from a worm grower or bait shop (at a cost of around \$28). Within five months, they will multiply to around four to five thousand. They're also voracious, and will eat virtually anything organic — the only thing you have to be careful of is feeding them too much citrus peel or onion. Theoretically, a worm will eat its own body weight in a day. Around 5000 worms — the maximum capacity of the Reln Worm Factory — will be able to dispose of 1.25 kg of kitchen scraps a day.

According to Douglas Darbyshire, worms also have a potential commercial use as a way of disposing of organic waste which is "only limited by imagination". Abattoir waste, fruit and vegetable pulp from processing, fish entrails, vegetable waste from markets, and even sewage — both animal and human — can be converted into a valuable product using worms, he says.



Worm farms: a neat, clean way to get fertiliser from organic household waste.

JAPANESE STYLE

THE Japanese, in their inimitable style, have come up with a much more high-tech solution to the organic waste problem than worms. According to the *Japan Times*, Japanese manufacturers have reacted to growing public concern over refuse and recycling problems by marketing a series of household garbage disposal gadgets.

One such device, the 'Mam' is the same size as a small refrigerator and turns waste into garden compost using a decomposition agent which includes bacteria and wood chips. However, it costs around \$800 and can only store one kilo of garbage for six months!

Another, marketed as 'Magic Poy' uses a high-pressure water device to compress garbage to reduce its volume by around two-thirds.

CFC-FREE FRIDGES ON THE MARKET

THE first chlorofluorocarbon (CFC)-free refrigerators for sale in Australia were launched earlier this year by local manufacturer Email.

The WESTINGHOUSE Aurora and the KELVINATOR Daintree both use a hydrofluorocarbon (HFC) in place of the CFCs traditionally used as a refrigerant, and a hydrochlorofluorocarbon (HCFC) as a blowing agent for the foam insulation in fridges and freezers. The new refrigerant these models use is HFC134a. It contains no chlorine and is believed to cause no damage to the ozone layer. The new blowing agent — HCFC141b — is believed to have an ozone-depleting potential one-tenth that of the CFC currently used in conventional fridges.

Both models are energy-efficient, with a four-star rating. We will be including the WESTINGHOUSE Aurora — a 410 L model — in our next refrigerator test, scheduled for January 1994. By the end of 1994, all fridges manufactured in Australia will be required to be CFC-free.

According to Email's chief executive, Don McNeill, the company will continue to try to reduce the environmental impact of its fridges. "To reach our longer-term goals, Email engineers will continue working with their colleagues around the world to develop refrigerators which contain neither CFCs nor HCFCs and so totally protect the ozone layer and contribute even less to global warming," he said.

Overseas, German manufacturer Foron has already taken that step, developing a fridge which uses a mixture of propane and butane (hydrocarbons) as the refrigerant and expanded polystyrene blown with carbon dioxide and steam as the insulation. While propane and butane are highly flammable, the risk of explosion if the refrigerant was to leak has been virtually eliminated by isolating the refrigerant circuit from any potential ignition source, such as the temperature regulator and the light.

Unlike earlier versions using this technology (including the German model we tested for Greenpeace and discussed in our fridges report in May 1993), the latest model is said to be 10% more energy-efficient than the conventional model it is designed to replace.

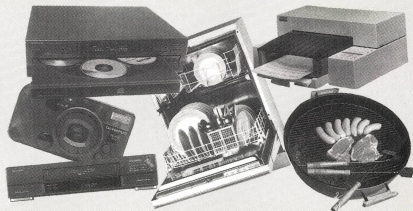
Other European manufacturers have also begun to use hydrocarbons, which are ozone-benign. In Japan, Sharp is reported to have launched a model using a vacuum as insulation early this year. □

The 9th CHOICE Subscriber Draw

For new subscriptions and renewals received July 1 to September 30, 1993.

Subscriber draws are now held quarterly and on October 1 we'll be holding our ninth. The lucky winner will be able to choose any two products from the following tests published January 1993 to March 1993.

- | | |
|--|---|
| ☐ Barbecues (January 1993) | ☐ Dishwashers (February 1993) |
| ☐ Washing machines (January 1993) | ☐ VCRs (March 1993) |
| ☐ Water filters (February 1993) | ☐ Computer printers (March 1993) |
| ☐ Compact cameras (February 1993) | ☐ CD players (March 1993) |



These are products we bought for testing, so you won't be the first to turn them on or set them up. But we'll cover any service problems with a CHOICE warranty that'll match the manufacturers' — just as if you'd bought them new.

All new CHOICE subscriptions and renewals received from members and personal subscribers (including donors of gift subscriptions) by September 30 will go into the draw, unless of course you indicate you don't want to be included.

If you're not due to renew your subscription during the period, don't worry, we'll be holding other draws during the year — your renewal notice will have the details. And if you're on a two-year subscription you'll be entered on your first anniversary as well as when you renew again.)

 Use the order form overleaf 

CONDITIONS OF ENTRY

- The winner will be drawn from new subscriptions and renewals from personal subscribers (including members and donors of gift subscriptions) received July 1 to September 30, 1993. If you opt for a 2-year subscription, you'll be entered on your first anniversary as well as when you actually renew or subscribe.
- Information on how to enter and prizes form part of these conditions of entry.
- Employees, and their immediate families, of the Australian Consumers' Association and its associated companies and agencies are ineligible to enter.
- Entrants must be residents of Australia.
- Applications are subject to a verification check and judge's decision is final. No correspondence will be entered into.
- The prizes will be delivered free anywhere within Australia.
- Prizes cannot be taken as cash.
- South Australian residents may enter the draw by completing the form and posting to: Reply Paid No. 13, ACA, 57 Carrington Road, Marrickville NSW 2204, without subscribing to the magazine. Only one entry per person is permissible through this method.
- Last date for receipt of entries to the draw is September 30, 1993. No responsibility accepted for lost, late or misdirected mail.
- The draw will be conducted at the office of the Consumers' Association at 10 am on October 1, 1993.
- The winner will be notified by letter and published in the December 1993 issue of CHOICE magazine.
- The promoter is Australian Consumers' Association, 57 Carrington Road, Marrickville NSW 2204.
- NSW Permit No. TC93/1961, VIC Raffles & Bingo Permits Board Permit No. 93/1264 issued on 11/5/93, ACT Permit No. TP93/0768 issued under the Lotteries Ordinance, NT No. NT93/0603.

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Consumer Rights Advice

CHOICE operates consumer rights lines for people having problems with a faulty product or a dispute with a service person. The lines set out what your basic rights are and what steps you can take to protect them. These lines are also available in four languages other than English — Vietnamese, Arabic, Chinese and Turkish.

CHOICE Consumer Rights Advice:
0055 200
Advice in Vietnamese:0055 200
Advice in Turkish:0055 200
Advice in Chinese:0055 200
Advice in Arabic:0055 200

Youth lines

A line specifically for young consumers, 'Ripped-off' Line, outlines your shopping rights as well as letting you know what you can do if you run into problems with something you have bought.

Students can also call a resource line to find out where to get up-to-date information on the consumer movement and the environment. These two topics are the most requested by students and teachers who request our Consumer Information Service.

CHOICE 'Ripped-off' Line — Advice for Young Consumers:
0055 200
CHOICE Student Resource Guide:
0055 200

Product advice

A number of product lines also summarise what to look for when you are buying a particular product. Brand-name recommendations aren't included, however — the remain exclusive to CHOICE subscribers.

CHOICE Washing Machine Advice:
0055 200
CHOICE Water Filter Advice:
0055 200
CHOICE Baby Products Advice:
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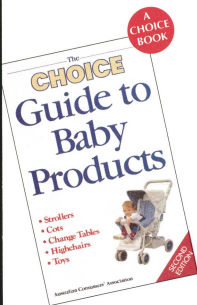
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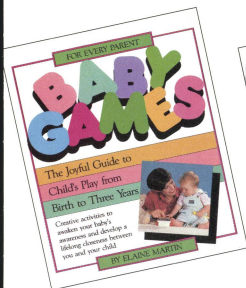
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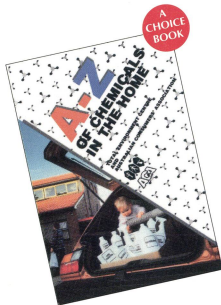
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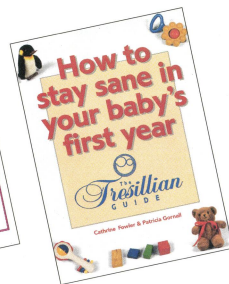
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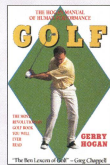
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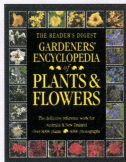
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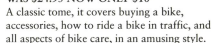
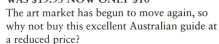
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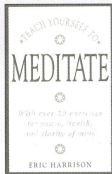


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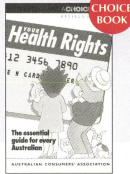
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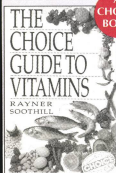


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CHOICE helped to write this young person's guide to the environment. It gives positive examples of things that can be done (and are being done) to help solve problems.

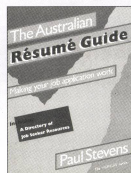


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CHOICE GUIDE TO CAMERAS & CAMCORDERS

\$19.95 post-free softcover 104pp

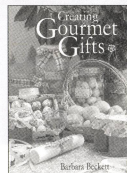
This Guide contains detailed test results, with advantages, drawbacks and verdicts on each model tested on European testing. It recommends many purchases. It also includes useful tips for getting the best results from your camera or camcorder.



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CONSUMER IN LAW

CLAIMING ON INSURANCE

The language in most insurance policies is impenetrable, with complex, overlong sentences and a maze of clauses. You shouldn't give up if the insurer is relying on some of this unfriendly wording to deny your claim — the law may be on your side.

AN INSURANCE COMPANY WRITES ...

"We would also point out that this incident was not reported ... within a reasonable period and grounds exist for rejection on this point alone."

"Having considered ... the policy conditions dealing with 'immediate notification' ... I feel that excellent grounds exist for denial of indemnity."

It's usual for insurance policies to require notice is given of an event which gives rise to (or even may give rise to) a claim "immediately", "promptly", "as soon as possible" or within a certain number of days. So it would appear that if you fail to tell the insurer immediately, your claim can be rejected. The above extracts are from letters sent to a policyholder whose policy required "immediate notification" of a claim. This is a clause designed to give the insurer an opportunity to minimise its loss and fully investigate the circumstances — not to get out of paying. Section 54 of the Insurance Contracts Act says an insurance company cannot refuse to pay a claim in certain circumstances — in particular where the insured has done nothing to cause or contribute to the loss.

Although many insurers will deal reasonably with a claim that's late — the NRMA tells us, for example, it would not refuse any claim on the basis of late lodgment — the late notification may well make them look carefully at the claim itself. If you fail to abide by certain minor points in the contract — such as not lodging a claim within a certain period of time — you could find yourself receiving letters like those quoted above, but don't let them put you off pursuing your claim. This article tells you how to go about it if all is not straightforward.

INSURANCE POLICY language was always complex, and has often become well-nigh impenetrable as it's been refined to avoid misinterpretation in the courts and to close loopholes as they've appeared. Clauses have often been added or refined over the years, contributing to the difficulty of finding your way around a policy. Nevertheless, reading the policy is still your best bet as a starting point to understanding what's covered, what's not and what you have to do in the event of a claim.

Examples of what your policy should tell you could be: if the radio is stolen from your car how much would you have to pay towards the new one? If the roof is blown off your home do you need to notify the insurer before you have repairs carried out? What's the proce-

sure you have to go through if you need medical treatment when you're abroad? What do you have to do to make a claim? However, if you're not certain what your policy really says or you think it's blatantly unfair, don't give up.

An insurance policy is a contract between you and an insurance company, in which it promises to pay out if certain situations arise. But contracts between parties of very different size, such as between you and an insurance company, can often be difficult. You're unlikely to have the time or the resources to understand the full significance of each clause and be up-to-date with the latest court rulings. It's to help redress this balance that there's a wide range of Australian law dealing with unfair contracts; for insurance the particular law is mostly contained in the Insurance Contracts Act 1984. This Act was designed to balance the interests of the insured and the insurer and to make insurance operate more fairly, so even if there's something in the policy which makes it look as though you're not covered you may find the law is on your side. For example:

■ The insurer can't use non-disclosure on unrelated issues to reject your claim, unless it would never have accepted the risk in the first place.

■ Both you and the company are bound to a duty of utmost good faith — it must deal honestly and fairly with you as well as vice versa.

CLAIMING ON INSURANCE — WHAT YOU CAN DO

If you're making a claim and things aren't going smoothly, don't give up too soon:

■ Check the policy. If what you're claiming for was caused by a chain of events, you may be covered if your policy covers any of the events — even if it doesn't cover the last. For example, if building



subsidence was caused by water leaking from a pipe you may be able to claim, even if your policy doesn't directly cover subsidence.

■ If you think there's any possibility your claim would be accepted, or if an exclusion clause would seem to apply but doesn't appear to be fair, pursue it. Ask the insurer for a claim form and fill it in — if you bought the insurance through a broker you might ask them for help.

■ If your claim fails at the first attempt write to the chief executive of the insurance company, setting out the details in a short letter and asking for the case to be reviewed.

■ If your claim is still refused or reduced there are other bodies which may be able to help or other legal remedies available:

■ The insurance industry finances two review schemes which can look at individual cases for people insured with member companies (most large insurers). General insurance disputes (eg house or car insurance) can be dealt with by the Claims Review Panel, which is run by the Insurance Council of Australia (ICA) — your first step is to contact your state office of ICA, which will try to resolve the dispute directly with the insurance company; for the head office call 008 034 496 (or 629 4109 in Melbourne). If this fails, your complaint can be dealt with by the Claims Review Panel. For problems with life insurance contact the Life Insurance Federation of Australia (LIFA) — 008 335 405 (or 629 5751 in Melbourne). A CHOICE report on these two schemes is planned for the near future. If your problem is with the SIO or GIO in Victoria there's a separate scheme called SIO Consumer Appeals Centre which can help — call 008 133 839 (or 649 1031 in Melbourne).

■ The state small claims procedures in each state can deal with insurance issues (except Queensland, which excludes insurance contracts from allowable case matters, and NSW and Victoria, which can't deal with life insurance). There are varying dollar limits — up to \$10 000 in NSW, but only \$2000 in Tasmania. For more information see *Consumer in law*, CHOICE, August 1991.

■ If the claim is substantial you might consider employing a solicitor and even taking it to court, but you will need professional legal advice before you embark on this potentially very expensive course of action.

■ There are a few public loss assessors who will help individuals pursue claims, and may work for a proportion of the claim amount they obtain for you. □



LETTERS

Send your letters to **CHOICE**, 57 Carrington Road, Marrickville 2204. Where possible, please include your daytime telephone number, as we may wish to contact you direct for more information or to discuss your comments and queries.

THE CHOICEST CHOICES

I have been a subscriber to your publication for many years, and always enjoy the various articles and surveys. When purchasing anything major, I always check recommended items from CHOICE.

Have you ever considered having a spot in your publication for 'Choice Choices', or readers' favourite buys/recommendations? It could be quite interesting reading — I would envisage readers sending in details of the best purchase or idea they have ever gained from CHOICE.

I would like to start the ball rolling with my 'Choicest Choice'. Since your article many years ago on face moisturisers, I have always made my own with your recipe using sorbolene/glycerine. It's wonderful stuff for all-over-body use, not just faces. Budget-wise it's absolutely fantastic — one large tub of sorbolene and glycerine lasts me about two years when made into moisturiser with the addition of water. This one 'Choice' alone must have saved me several hundred dollars over the past few years.

Thank you for your excellent publication. Keep up the good work!

J L Hill
Glen Forrest, WA

TINS A DANGER

In the past month, two cats on our farm have accidentally killed themselves when trying to lick the inside of an empty 700 g tin of cat food. They have not been able to remove the tin, and have subsequently suffocated.

The occurrence should not arise in a normal domestic situation, as most pets should not be hungry enough to try this, and empty tins are normally disposed of in cat-proof bins.

These events happened in a rural situation, where both cats were strays, and the discarded tins were in a plastic bag waiting for disposal. The first time, I thought it a million to one occurrence, but now I feel people should be warned of the possibility. I am now squashing each tin when empty.

T V Cowan
Benalla, Vic

CHILD-SAFE OVENS

I read with interest your article on electric ovens (CHOICE, June 1993).

I am the proud owner of a SMEG SA600 electric oven and can say I am extremely happy with it.

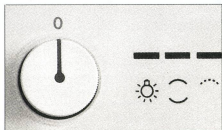
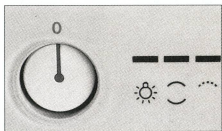
An additional factor which was important to me when buying an oven was consideration of our small children's (one and three years) safety. You made no mention of child safety. Can they:

- Open the door too easily?
- Put knobs in their mouths?
- Turn on the oven?

The SMEG SA600 has knobs which are flush with the oven's surface when not in use; you press them to make them pop out for use. My 12-month-old daughter still has not worked out how to use them on the rare opportunity she gets there first. Shortly after buying our oven we visited a friend who has a different brand of oven and within seconds my daughter had turned the oven on, pulled the top two parts of one knob off and had them in her mouth. I think this is an extremely important consideration which should be tested, as these ovens are at under-bench height and easily accessible.

G Barnett
Carlingford, NSW

A 'childproofing' feature — knobs flush to the Smeg oven's surface when not in use (top), popping out when needed (bottom).



IMPACT DRILLS FOR DIY USE

Watch out for annoying features on some impact drills.

BRANDS EXCLUDED

All Kango, Kress and Metabo drills were excluded as they didn't have models in the price range and chuck size we tested. Various models from brands reported on were excluded for the same reasons. Panasonic/National does not market mains-powered impact drills.

AN IMPACT DRILL differs from a straight power drill by also having a hammer action which pounds the drill bit into masonry with something like 40 000 small blows per minute. The drill bit rotates clockwise at the same time. The hammer action smashes the masonry as the drill bit moves forward, and the fluted section of the bit removes the debris by dragging it out of the hole.

You won't get very far into stone, brick or cement without a hammer action on your drill. It will help with plugging brick walls to take picture hooks, fitting skirting boards and architraves, attaching a gatepost to the side of the house, hanging an extending clothesline off a brick wall and many other household tasks.

On the other hand, hammer action shouldn't be used on timber, steel or plastics — turn it off when using the drill on these materials.

Market figures tell us about 85% of the power drills bought by consumers are the impact type, which nowadays cost about the same as non-impact drills.

For this report we tested impact drills for the home, with a chuck size of 10 mm and a price under \$180. The 12 drills which met these criteria were tested practically on masonry, and their effective power output was measured. A three-person panel assessed them for ease of use. Results are given in the table overleaf; details of tests are in the notes below it. All the drills passed electrical safety tests.

WHAT TO LOOK FOR WHEN BUYING AN IMPACT DRILL

- Variable speed is better than two speeds or a single speed.
- A power rating of at least 400 watts for home/DIY use.
- A reverse action as well as variable speed lets you use the drill as a screwdriver.
- Clearly marked impact/ordinary and normal/reverse switches.
- A fixed-position auxiliary handle to allow two-handed operation.
- A handle that's easy to grip.
- A large chuck key with a good attachment point so it won't get lost. Small chuck keys are more difficult to use.

When using an impact drill, remember:

- By running the drill at very low speeds under heavy load you risk burning out the motor windings, as they overheat due to high power input with low power output. The drill relies on its own fan action for cooling, but at low speeds the cooling air flow is drastically reduced.
- For masonry, drill bits must be tungsten carbide tipped in order to handle the abrasive material.

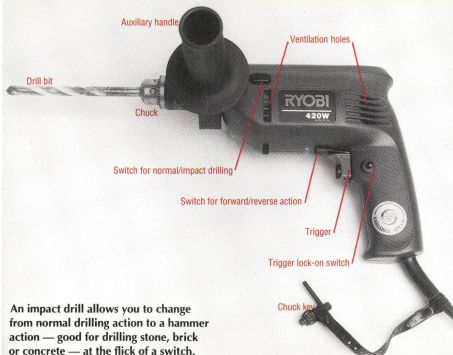
SPEED CONTROLS

Some power drills let you gradually raise the speed by applying increasing pressure to the trigger, while others are restricted to certain constant speeds of operation. There may be two speeds, or even just one (as with the MAKITA HP1010). With these drills you get the full speed as soon as you press the trigger.

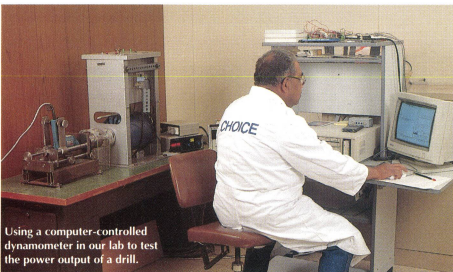
This is a disadvantage as it's very useful to be able to match your drill speed more finely to what's going on at the point of impact. For example, it's helpful to start drilling slowly so as to avoid the drill careering off a smooth surface. This requires a drill with variable speed. If using the drill as a screwdriver you'll also need variable speed.

The drills in our price range for this test have their speed controlled electronically. Professionals prefer a combination mechanical gearbox and electronic system, which gives more torque (twisting force) at low speed. It's a costlier proposition, though.

Many of the drills have reverse action: the drill bit can be made to turn anti-clockwise (see the table for which



An impact drill allows you to change from normal drilling action to a hammer action — good for drilling stone, brick or concrete — at the flick of a switch.



Using a computer-controlled dynamometer in our lab to test the power output of a drill.

There are switches to select the various performance modes of these drills; some switches are easier to use than others. Differences are highlighted in the product profiles.

We measured the noise of each of these drills and found all are noisy (between 88 and 103 decibels at a distance of one metre). Ear muffs are necessary to protect your hearing and goggles and sometimes a dust mask are also important safety accessories.

WHAT TO BUY

AEG SB2-400 N	\$104/\$145
HITACHI FDV 12V	\$120/\$160

The AEG SB2-400 N was the best-performing drill in both ordinary and impact modes. It's also one of the cheapest models. However, buying it would limit your options for use as it lacks variable speed control and reverse running.

The next most powerful drill in impact mode is the HITACHI FDV 12V. It has variable speed and reverse action and is the one to buy if you want these useful features.

The BLACK & DECKER BD564 and RYOBI PD-12VR were significantly less effective than the other drills in impact mode.

models). This can be helpful in extracting the drill bit from a tight spot, or when using the drill as a screwdriver (with appropriate screwdriver-head bit, of course). A switch on the body of the drill lets you select forward or reverse action.

GET ONE THAT'S EASY TO USE

Power drills have different shapes, some of which may not suit your hand size or strength, so try them out in the shop. The

product profiles and the weight information in the table will give you an idea of the range.

An auxiliary handle lets you steer the drill more confidently. There are two types: one that screws into a fixed position in the side of the unit, and one that fits like a collar around the neck. We found the collar style is liable to shift position in use, so recommend the fixed type.

PROFILES

Drills are pictured in rank order. Prices shown indicate the range found in nationwide checks in June 1993.

AEG SB2-400 N

Price: \$104/\$145

This was the most powerful drill in our test, but lacks variable speed and reverse action. If you want these features, buy the HITACHI FDV 12V.

Good points

- The best performer for both ordinary and impact drilling.

- Large chuck key.

Bad points

- No reverse running.
- Two speeds only.
- Impact/ordinary positions not clearly marked.

HITACHI FDV 12V

Price: \$120/\$160

Good points

- Very good impact drilling performance.
- Large chuck key.
- Variable speed.

Bad points

- Can be changed from impact to ordinary or vice versa unintentionally when drill is put down on its side.
- The impact switch button was loose at times, though it didn't disengage.



MAKITA NHP 1030

Price: \$159/\$225

Good points

- Variable speed.
- Large chuck key.
- Fixed auxiliary handle supplied.
- Best overall for ease of use.

Bad points

- Large squarish handle is uncomfortable.
- Though you could adjust the maximum speed of the drill by turning a knob, this was placed high up on the trigger and was awkward to use.

AEG SBE 400 R

Price: \$126/\$158

Good points

- Variable speed.
- Large chuck key.
- Chamber on drill for bit storage.

Bad points

- Forward/reverse direction not clearly marked on drill.
- Can be put into reverse accidentally when picked up if switch is touched.
- Impact/ordinary positions not clearly marked.

Impact drills

	Brand/model (in rank order)	Manufacturer/ distributor	Origin	Price* (\$)	Warranty (months)	Weight (kg)	Claimed power (W)	Speed options	Revers action
	AEG SB2-400 N	Atlas Copco Tools	Germany	104/145	6	1.9	400	Two-speed	
	HITACHI FDV 12V	Hitachi	Japan	120/160	6	1.7	450	Variable	✓
	MAKITA NHP1030 (A)	Makita	Japan	159/225	6	2	430	Variable	✓
equal	AEG SBE 400 R (B)	Atlas Copco Tools	Germany	126/158	6	1.8	400	Variable	✓
	MAKITA HP1010 (A)	Makita	Japan	109/165	6	1.9	430	Single-speed	
	SKIL 6425 'Slugger'	Vermont America	US	92/120	12	1.6	400	Variable	✓
equal	BOSCH PSB 420 RE	Robert Bosch	Switzerland	139/172	6	1.8	420	Variable	✓
	BLACK & DECKER 2269 (C)	Black & Decker	Italy	140/195	12	1.9	450	Variable	✓
	HITACHI FDV 12T	Hitachi	Japan	105/128	6	1.7	450	Two-speed	
	RYOBI PD-12VR	Ryobi	Japan	122/180	12	2	420	Variable	✓
	BLACK & DECKER BD562	Black & Decker	UK	95/130	12	1.6	400	Two-speed	
	BLACK & DECKER BD564 (A)	Black & Decker	UK	117/149	24	1.6	400	Variable	✓

* Prices shown indicate the range found in nationwide checks in June 1993.

(A) Superseded earlier this year, but may still be in the shops.

(B) This model will become the SBE 450 R later this year.

(C) Extensive upgrades are planned for this model late this year.

MAKITA HP1010

Price: \$109/\$165

Good points

- Large chuck key.
- Fixed auxiliary handle supplied.

Bad points

- Single speed.
- No reverse running.
- Large squarish handle is uncomfortable.

SKIL 6425 'SLUGGER'

Price: \$92/\$120

Good points

- Variable speed.
- Auxiliary handle (collar type) and depth gauge supplied.

Bad points

- Forward/reverse label can peel off.
- Five drill bits can be stored in the auxiliary handle — but we found the lid kept falling off when drill was being used.

BOSCH PSB 420 RE

Price: \$139/\$172

Good points

- Large chuck key.
- Variable speed.
- Comes with a moulded plastic carry case.
- Three Philips-head screwdriver bits supplied.

Bad points

- Can be put into reverse accidentally when picked up if switch is touched.

BLACK & DECKER 2269

Price: \$140/\$195

Good points

- Large chuck key.
- Variable speed.
- Impact/ordinary positions clearly marked.

Bad points

- Short handle is too small for those with broad hands.

HITACHI FDV 12T

Price: \$105/\$128

Good points

- Large chuck key.

Bad points

- No reverse running.
- Two speeds only.
- Can be changed from impact to ordinary or vice versa unintentionally when drill is put down on its side.

Makita HP1010 Skil 6425 'Slugger' Bosch PSB 420 RE Black & Decker 2269



Hitachi FDV 12T Ryobi PD-12VR Black & Decker BD562 Black & Decker BD564



	2	3	4	5	Brand/model (in rank order)	
Accessories supplied	90	90	45	81	AEG SB2-400 N	
	77	89	62	79	HITACHI FDV 12V	
Auxiliary handle	80	75	71	76	MAKITA NHP1030 (A)	
	76	83	59	75	AEG SBE 400 R (B)	equal
Auxiliary handle	81	83	46	75	MAKITA HP1010 (A)	
Auxiliary handle, depth gauge	64	83	65	71	SKIL 6425 'Sluggo'	
Three screwdriver bits	61	81	61	69	BOSCH PSB 420 RE	equal
	68	73	60	69	BLACK & DECKER 2269 (C)	
	61	84	47	67	HITACHI FDV 12T	
Auxiliary handle, depth gauge	76	50	68	64	RYOBI PD-12VR	
Drill bits	63	75	39	63	BLACK & DECKER BD562	
	59	56	59	58	BLACK & DECKER BD564 (A)	

RYOBI PD-12VR

Price: \$122/\$180

Good points

- Variable speed.
- Auxiliary handle (collar type) and depth gauge supplied.

Bad points

- Lowest impact drilling score among drills tested.
- Small chuck key is annoying.
- Though you could adjust the maximum speed of the drill by turning a knob, we found it annoying to use as it had a range of more than six turns.

BLACK & DECKER BD562

Price: \$95/\$130

Good points

- Nothing in particular.

Bad points

- No reverse running.
- Two speeds only.
- The poorest score for ease of use.
- Small chuck key is annoying and there's no storage point.

BLACK & DECKER BD564

Price: \$117/\$149

Good points

- Variable speed.
- Very clear forward/reverse switch markings.

Bad points

- Low score for impact drilling performance.
- Small chuck key is annoying and there's no storage point.

FOR PEOPLE WITH DISABILITIES

The drills were assessed by an occupational therapist from the Independent Living Centre.

- Chuck keys should be large: the two AEGs, the BLACK & DECKER 2269, BOSCH PSB 420 RE and the two HITACHIs and MAKITAs had large keys.

- Trigger switches should be large so two or three fingers can be used: BLACK & DECKER 562, BLACK & DECKER 564, BOSCH PSB 420 RE and the two HITACHIs. The triggers of the RYOBI PD-12VR and SKIL 6425 were too small. The force needed to pull back the triggers of the MAKITAs, RYOBI PD-12VR and SKIL 6425 was too high for some people.

- Long, comfortable handles are needed: all except the two MAKITAs and BLACK & DECKER 2269 were good in this respect. Auxiliary handles on the MAKITAs, RYOBI PD-12VR and SKIL 6425 were a great help.

- Switches should be easy to use. The impact/ordinary switch was found to be difficult to use on the two AEGs, BLACK & DECKER 2269, RYOBI PD-12VR and the two MAKITAs. The lock-on switch was difficult to use on the SKIL 6425.

Overall, go for the HITACHI FDV 12V, but make sure you try out any drill before buying: check ease of operating switches and whether you can hold the drill securely. All these drills are considered heavy.

1 Reverse action

If a power drill has variable speed and reverse action in addition to forward operation it makes it practical to use the drill as a screwdriver. You'll need special screwdriver drill bits.

2 Normal drilling score

Using a computer-controlled dynamometer, the effectiveness of the drill in normal drilling mode was assessed. At full trigger pressure and maximum speed an increasing load was applied. This caused the drill to slow down as if it were drilling into a heavy piece of timber. When the load was great enough to slow the drill to 65% of its no-load speed, the power output was measured — power output indicates how effective the drill would be in a real-life situation. The score is proportional to the power output at this point. Each drill was tested three times and scores averaged.

3 Impact drilling score

Each drill was tested on the impact setting using masonry paving blocks. The drills were tested at their highest speed setting, with automatic power shut-off after six seconds of drilling. A constant-force rig was constructed to ensure the force applied during drilling remained constant for each drill. A total of 22 holes was made using each drill. The score is proportional to the sum of the depths of the 22 holes.

4 Ease of use score

Ease of use was assessed by a three-person panel allocating scores by looking at the following: the chuck, chuck key, trigger and lock button, speed control, reversing switch, reverse switch markings, impact switch, handle and auxiliary handle (if supplied).

5 Overall score

The above three factors were weighted as follows to give the overall score:

- Normal drilling: 40%.
- Impact drilling: 40%.
- Ease of use: 20%.

A ROUND OF DRINKS



CHAMPAGNE

Moët & Chandon (non-vintage) 750 mL

Austria	78
Singapore	70
Hong Kong	68
Denmark	64
New Zealand	60
Ireland	59
Australia	53
United States	49
Spain	48
Belgium	46
UK	41
Germany	39
Switzerland	38
France	35

BEER

Most popular brand 375 mL*

Ireland	2.41
New Zealand	2.41
Singapore	2.36
UK	2.27
South Korea	1.62
Australia	1.45
Belgium	1.20
Hong Kong	1.15
Switzerland	1.12
Denmark	1.10
Austria	1.04
Spain	1.01
France	0.99
United States	0.74
Germany	0.72

* Or the closest available size to 375 mL. In the UK and Ireland this is 440 mL and 500 mL respectively, which accounts in part for the bigger price difference.

GIN

Gordons 750 mL

Singapore	44
Denmark	43
Switzerland	39
Hong Kong	28
Australia	27
Austria	26
Ireland	25
UK	24
South Korea	23
Belgium	19
Germany	19
New Zealand	18
France	16
United States	15
Spain	11

SODA WATER

per litre*

Spain	3.92
Denmark	2.36
Ireland	1.79
Hong Kong	1.77
UK	1.70
Singapore	1.67
South Korea	1.54
United States	1.33
Australia	1.08
New Zealand	0.95
Germany	0.88
Switzerland	0.73
France	0.72
Belgium	0.71
Austria	0.52

* Soda water is sold in different-sized bottles in every country - we converted to per litre prices for comparative purposes.

■ All prices are in Australian dollars, based on exchange rates quoted in the *Australian Financial Review*, June 10, 1993.



WHAT DO YOU KNOW?

- 1** Celery effectively has 'negative kilojoules' because you burn more energy chewing it than it contains. True or false?
- 2** Light alcohol beer was introduced in Australia in 1960. True or false?
- 3** All clothing sold in Australia must carry labels providing adequate information on washing, drying, ironing, etc. True or false?
- 4** Vodka is more likely to give you a hangover than any other alcoholic drink. True or false?
- 5** Child car restraints should be braced against the seat in front to prevent the restraint moving around too much in an accident. True or false?
- 6** If you believe the Tax Office has made a mistake with your assessment, you have till the end of the next financial year to lodge an official complaint. True or false?
- 7** It is planned that by 1997 the Australian telephone market will be open to any phone company that wants to set up here. True or false?



RECALLS AND BANS

If you find a recall or ban not on our list please let us know.

Garrett White has recalled ALL FROZEN AND FRESH MEAT PASTRY PRODUCTS INCLUDING PIES, PARTY PIES, SAUSAGE ROLLS AND PASTIES sold under the following brand names: BEST BUY, BIG BEN, BI-LO, COLES-SAVINGS, FRANKLINS IN-STORE BAKERY MEAT PIE (sold through Leichhardt NSW Big Fresh store only), FRESH BAKE, JEWEL-NO NAME and WOOLWORTHS HOMEBRAND, as contamination with the poison potassium cyanide has been found in some products while still within the factory. (No contamination has yet been found in products which have left the factory). Do not eat. Destroy the contents and return the barcode to retailer for refund. New purchases are unaffected.

K Mart has recalled the HOMEMAKER THERMOSTATICALLY CONTROLLED FAN HEATER (grey plastic, 30 cm high and sold from K Mart stores since February 1993) as the heating coils may come in contact with the body of the heater, causing the plastic to melt and, possibly, to catch fire. Do not use. Return to retailer for refund.

Heating Systems has recalled HEATWAVE, TECH MIRAGE, NIGHTMOODS and TRANQUILITY WATERBED HEATERS, purchased either as part of a waterbed or as a separate component (from July 1991 to September 1992, serial number range 010791 to 060892) as it may malfunction. Do not use. Contact your retailer to arrange inspection urgently.

Honda has recalled 1992 HONDA ACCORD AERODECK WAGONS (identification number range IHGCB97400A100001 to IHGCB97400A100184 and IHGCB98400A100001 to IHGCB98400A100365) as variation in calibration of a sensor in the rear seatbelt may cause difficulty in withdrawing the seatbelt if the vehicle is parked on an angle. Contact your Honda dealer to arrange replacement at no cost.

Bloom's Health Foods has recalled BLOOMS VALERIAN ROOT HERBAL TEA 75g as animal excreta has been detected in one batch. Do not consume. Return full or partially used packs to retailer for refund.

Big W has recalled the 4-PIECE COOKWARE SET (sold by Big W since 7/2/93, in the colours green, black and cranberry) as the handles may come off. Each set comprises two saucepans with lids, one casserole with lid and

one frypan. The internal surface of each has a black non-stick coating with the label 'Xylan'. Return to your nearest Big W for refund.

Mazda has recalled MAZDA 626/MX6 MOTOR VEHICLES as a wire in the front wiring harness may short to earth and cause a fuse to blow, leading to one of the following conditions: the engine stops and cannot be restarted, the engine runs poorly, headlights or windscreen wipers stop working. Affected vehicles are: MX6 October 11, 1991, to February 19, 1993 (serial numbers JMO GE10L1 00100001 to JMO GE10L1 00128072); 626 V6 with ABS brakes, November 12, 1991, to November 5, 1992 (serial range JMO GE10L1 00100001 to JMO GE10L1 00117888); 626 V6 without ABS brakes, November 12, 1991, to September 10, 1992 (serial range JMO GE10L1 00100001 to JMO GE10L1 00116102). Contact your Mazda dealer to arrange inspection.

Coles has recalled SAVINGS and FARMLAND TINNED PINEAPPLE (product of Thailand) as some tins have been contaminated with poison. Do not consume. Return to retailer.

WARNING

Gas and Fuel Corporation of Victoria has issued a warning to all owners of BRAEMAR WALL FURNACE WF40, D10 or D11 (purchased 1968-1976) as they may be unsafe to use and could pose a fire hazard. Contact your local gas office to have your Braemar wall furnace checked.

SAFETY INVESTIGATION

Jeannette McHugh, federal Minister for Consumer Affairs, has asked the Federal Bureau of Consumer Affairs to investigate the safety of BABY WALKERS.

RETURN TO SALE

Oral-B recalled FLURET FLUORIDE TABLETS from Victoria in June due to concerns that the product was labelled incorrectly as S2 (over-the-counter sale) when it should have been S4 (available by prescription only). Victoria's Health Department has now clarified the position that it can be labelled S2 (as is the case elsewhere) and Oral-B has returned Fluret fluoride tablets to shops.

ANSWERS

- 1. False.** Chewing expends very little energy, so even though celery has very few kilojoules (it's mostly water) the number is still 'positive'. There is no such thing as 'negative-kilojoule' food.
- 2. True.** Although it sold very poorly until 1984.
- 3. True.**
- 4. False.** Vodka is less likely to give you a hangover than other spirits. Brandy is the worst.
- 5. False.** For safety reasons, car restraints need to be able to move a bit. You should be able to slide your fingers easily between the restraint and the back of the seat in front.
- 6. False.** You have four years after your notice of assessment was issued to make a complaint. See *The taxman and you* in the March 1993 issue of CHOICE for more information.
- 7. True.**

■ change of address ■ renewal
 ■ subscription inquiries
 Just write to:
 The Subscription Section
 Australian Consumers' Association
 57 Carrington Road, Marrickville 2204.
 or phone (02) 558 8088

TWELVE MONTH INDEX

SEPTEMBER 1992 — AUGUST 1993

(T) test
 (D) includes assessment of suitability for those with disabilities
 (F) feature — general advice
 (M) feature — includes market information
 (S) subscriber survey or user trial
 (C) Consumer in law
 (L) letter
 (U) update of previous report
 * additions or corrections to reports, small follow-up items

Air conditioners, reverse-cycle	Nov(T,D)	Drills, impact	Nov(T,D)
Air quality, indoor	Jan(F)	Economic jargon explained	Oct(F)
Allergies	Nov(F)	Environment quiz	May(F)
Answering machines	Oct(T)	Food	
Antibiotics	Aug(F)	coffee bags	Oct(S)
Arthritis	Oct(F),May(L)	frozen desserts	Dec(T)
Asthma management	May(F)	fruit substitutes for kids	Mar(T)
Audio equipment		grains and cereals	Jun(F)
CD players, multi-disc	Mar(T)	packaged meals for kids	Feb(M)
digital recording	Jun(M)	pasta, 'fresh'	Jul(T)
Australian-made labelling	Jan(F)	yoghurt	Nov(T)
Bank accounts	Sep(M),Nov*	Funerals, organising	Sep(F)
Barbecues, kettle	Jan(T)	Gas heaters, flued	Apr(T,D)
Beer, reduced-alcohol	Apr(T)	Glues	Jul(M)
Bicycle helmets	Oct(T)	Grains and cereals	Jun(F)
Bicycles, hybrid	Aug(T,S)	Greenhouse effect	Oct(F)
Blenders, handheld	Nov(T,D)	Hair and hair products	Jan(F)
Breast cancer	Jan(F)	Handheld blenders	Nov(T,D)
Buying guide, annual	Dec	Health insurance	Nov(M)
Cameras, compact	Feb(T)	Heaters, gas flued	Apr(T,D)
Carpets		Heating, home	May(F)
spot cleaners for	Sep(T)	Helmets, bicycle	Oct(T)
stain-resistance treatments	Nov(T)	High chairs	Jul(T,D)
Cars		Hiring tradespeople	Jul(F)
child restraints	Apr(M)	Home, chemicals in the	Sep(F)
clamping and tow-away	Feb(C)	Home heating	May(F)
insurance	Dec(S)	Hybrid bikes	Aug(T,S)
CD players, multi-disc	Mar(T)	Impact drills	Aug(T,D)
Chemicals in the home	Sep(F)	Index, four-year	Jun
Child car restraints	Apr(M)	In-line skates	Dec(T)
Cigarettes, low-tar	Aug(T)	Indoor air quality	Jan(F),Mar*
Clothes labelling	Apr(C)	Insulation	Apr(F)
Coffee bags	Oct(S)	Insurance	
Computer printers	Mar(T)	car	Dec(S)
Computers, notebook	Dec(T)	claims	Aug(C)
Cordless phones	Dec(T,D)	health	Nov(M)
Cosmetics, animal testing	Mar(M)	Investing in property	Jul(F)
Credit cards	Feb(F)	jargon, economic	Oct(F)
Debt harassment	Jul(C)	Labelling	
Desserts, frozen	Dec(T)	Australian-made	Jan(F)
Detergents, laundry	Mar(T)	clothes	Apr(C)
Digital recording	Jun(M)	Laundry detergents	Mar(T)
Dishwashers	Feb(T,D)	Legal advice, by phone	Nov(C)

Light bulbs, long-life	Jun(T)
Low-tar cigarettes	Aug(T)
Mattresses	Aug(M)
Notebook computers	Dec(T)
Ovens, electric wall	Jun(T,D)
Pasta, 'fresh'	Jul(T)
Pay TV	Oct(F),Feb(L)
Perfume	May(T)
Phone advice, legal	Nov(C)
Phones, cordless	Dec(T,D)
Pool fences	Dec(F),May(L)
Printers, computer	Mar(T)
Product recalls and bans	May(C)
Property, investing in	Jul(F)
Reclaiming stolen property	Sep(C)
Recycling	Apr(F)
Reduced-alcohol beer	Apr(T)
Refrigerators	
300-349 litre	Sep(T,D)
350-400 litre	May(T)
Reverse-cycle air conditioners	Nov(T,D)
Savings plans	Mar(F)
Secateurs	Oct(S),Feb(L)
Sewing machines	Apr(T,D)
Shade materials	Jan(F)
Shampoo vacuum cleaners	May(T,D)
Skates, in-line	Dec(T)
Slimming programs	Jun(M)
Spot carpet cleaners	Sep(T)
Standards Australia	Dec(F),Feb(L)
Stolen property, reclaiming	Sep(C)
Sun protection	Jan(F)
Superannuation guarantee	Feb(F),Jul*
Supermarket survey	Jul(S)
Supermarket trading terms	Jun(F)
Tax, rights and obligations	Mar(C)
Telecommunications	Feb(M)
Televisions	
pocket-sized	May(T)
portable	Apr(T,D)
TV, pay	Oct(F),Feb(L)
Unit pricing	Sep(F)
Vacuum cleaners, shampoo	May(T,D)
Vets' fees	Nov(F),Jan(L),Feb(L)
Video recorders	Mar(T)
Wall ovens, electric	Jun(T,D)
Washing machines	Jan(T,D),Mar*
Water heaters	Aug(T,S)
Water filters	Feb(T)
Yoghurt	Nov(T,F)